FIG. 1A

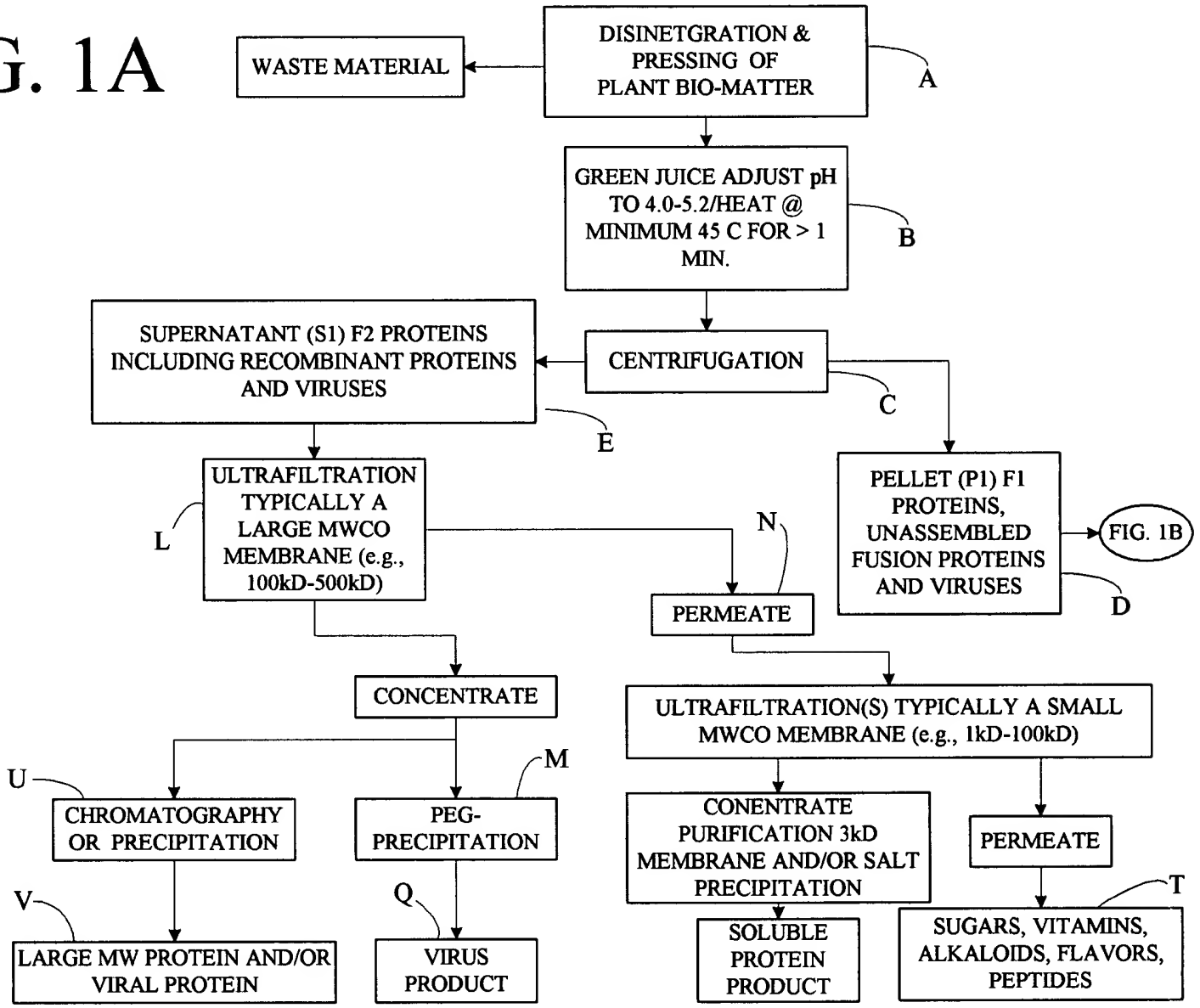

WASTE MATERIAL
DISINETGRATION & PRESSING OF PLANT BIO-MATTER
A
GREEN JUICE ADJUST pH TO 4.0-5.2/HEAT @ MINIMUM 45 C FOR > 1 MIN.
B
CENTRIFUGATION
C
SUPERNATANT (S1) F2 PROTEINS INCLUDING RECOMBINANT PROTEINS AND VIRUSES
E
PELLET (P1) F1 PROTEINS, UNASSEMBLED FUSION PROTEINS AND VIRUSES
FIG. 1B
D
ULTRAFILTRATION TYPICALLY A LARGE MWCO MEMBRANE (e.g., 100kD-500kD)
L
N
PERMEATE
CONCENTRATE
ULTRAFILTRATION(S) TYPICALLY A SMALL MWCO MEMBRANE (e.g., 1kD-100kD)
U
CHROMATOGRAPHY OR PRECIPITATION
M
PEG-PRECIPITATION
CONENTRATE PURIFICATION 3kD MEMBRANE AND/OR SALT PRECIPITATION
PERMEATE
V
Q
T
LARGE MW PROTEIN AND/OR VIRAL PROTEIN
VIRUS PRODUCT
SOLUBLE PROTEIN PRODUCT
SUGARS, VITAMINS, ALKALOIDS, FLAVORS, PEPTIDES

FIG. 1B

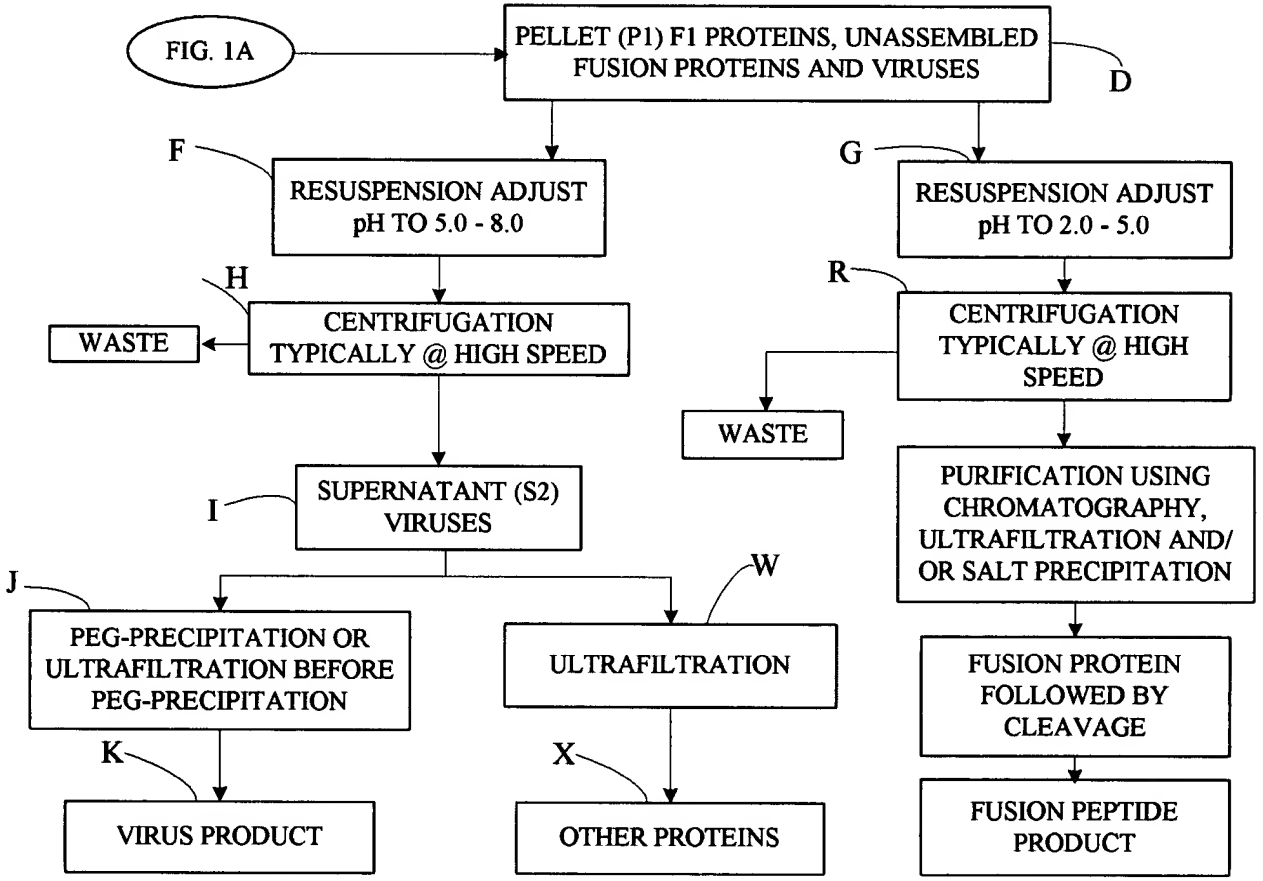


FIG. 1A
PELLET (P1) F1 PROTEINS, UNASSEMBLED FUSION PROTEINS AND VIRUSES
D
F
RESUSPENSION ADJUST pH TO 5.0 - 8.0
G
RESUSPENSION ADJUST pH TO 2.0 - 5.0
H
WASTE
CENTRIFUGATION TYPICALLY @ HIGH SPEED
R
CENTRIFUGATION TYPICALLY @ HIGH SPEED
WASTE
I
SUPERNATANT (S2) VIRUSES
PURIFICATION USING CHROMATOGRAPHY, ULTRAFILTRATION AND/ OR SALT PRECIPITATION
J
W
PEG-PRECIPITATION OR ULTRAFILTRATION BEFORE PEG-PRECIPITATION
ULTRAFILTRATION
FUSION PROTEIN FOLLOWED BY CLEAVAGE
K
X
VIRUS PRODUCT
OTHER PROTEINS
FUSION PEPTIDE PRODUCT

FIG. 2

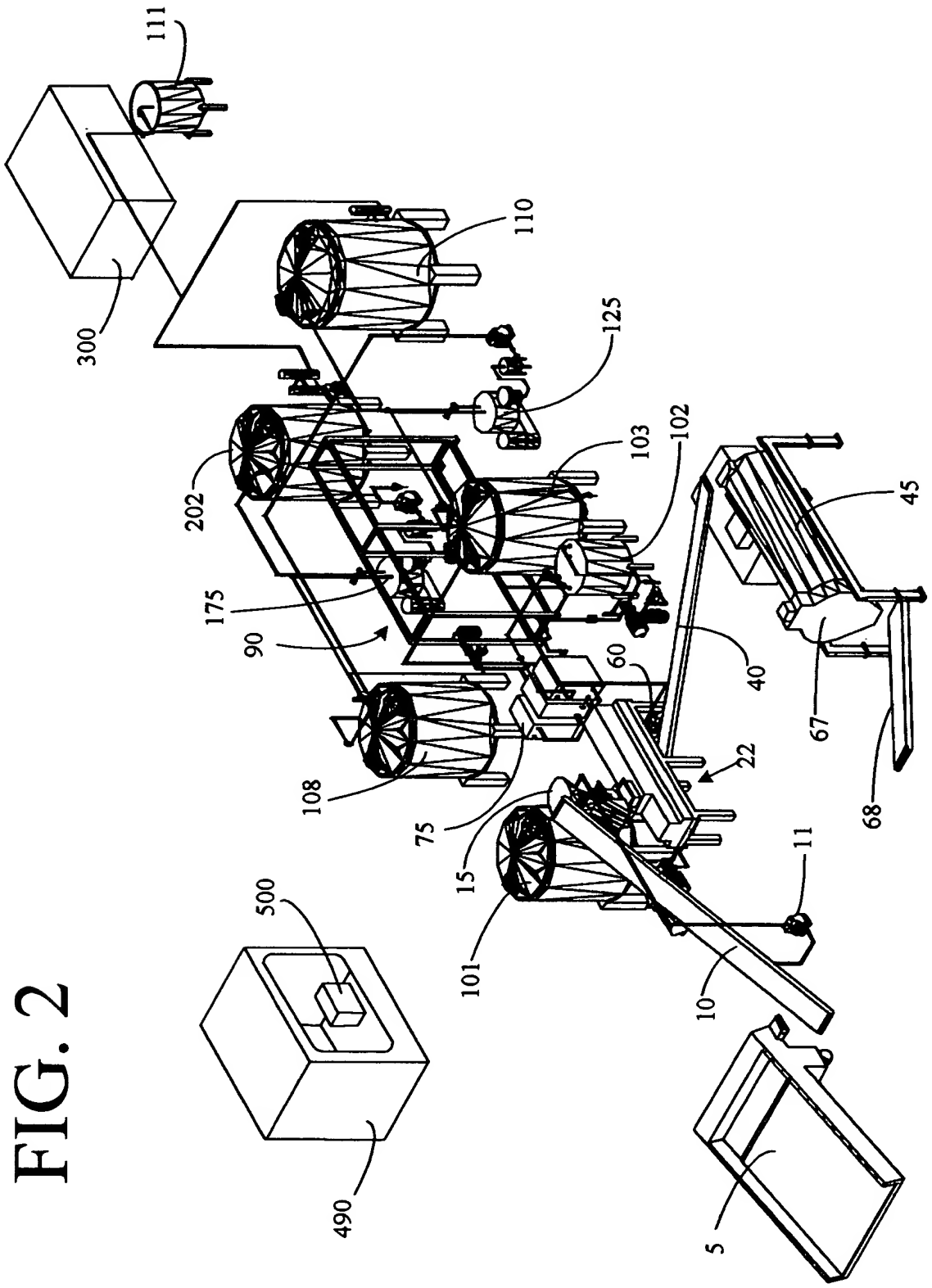


FIG. 3

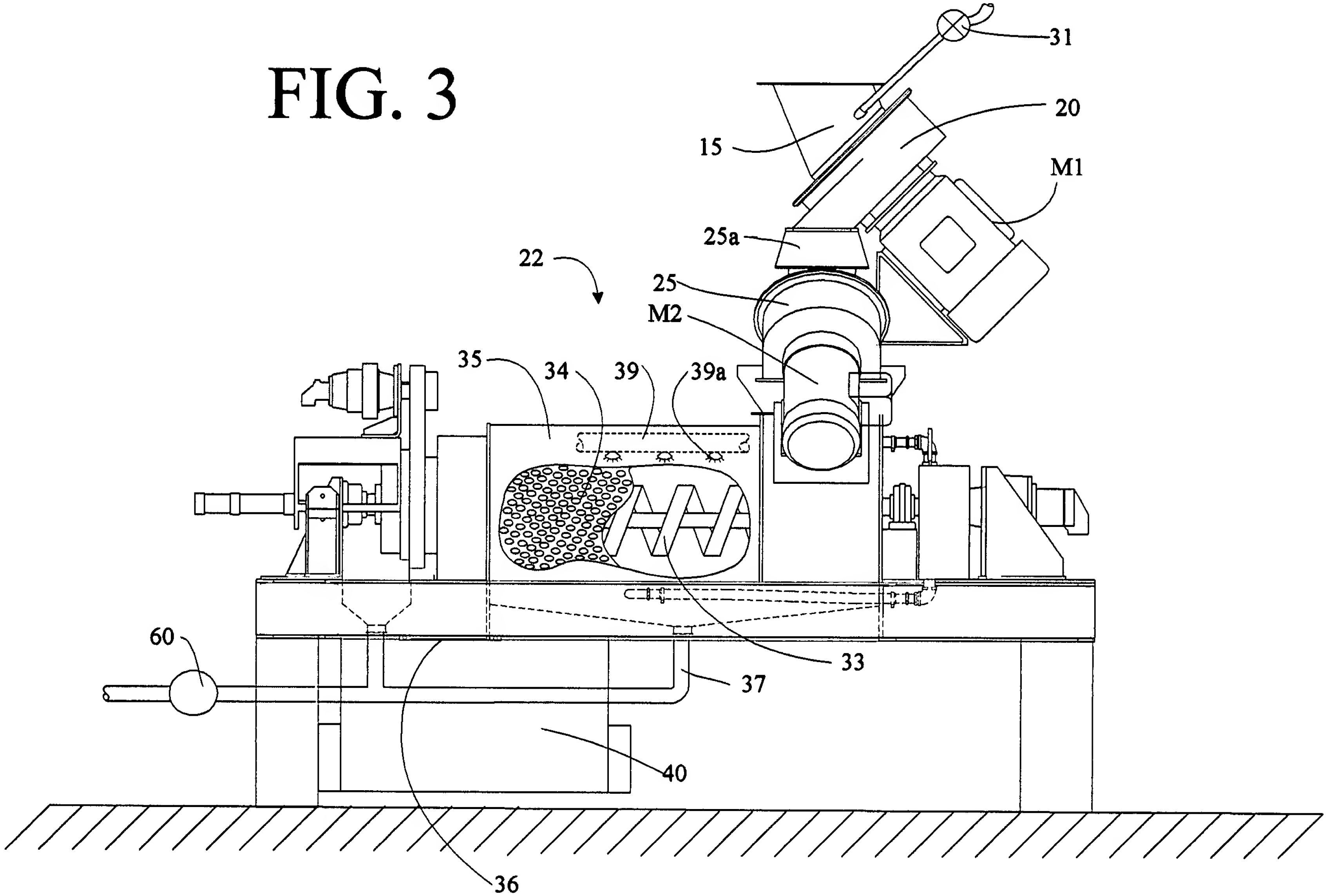
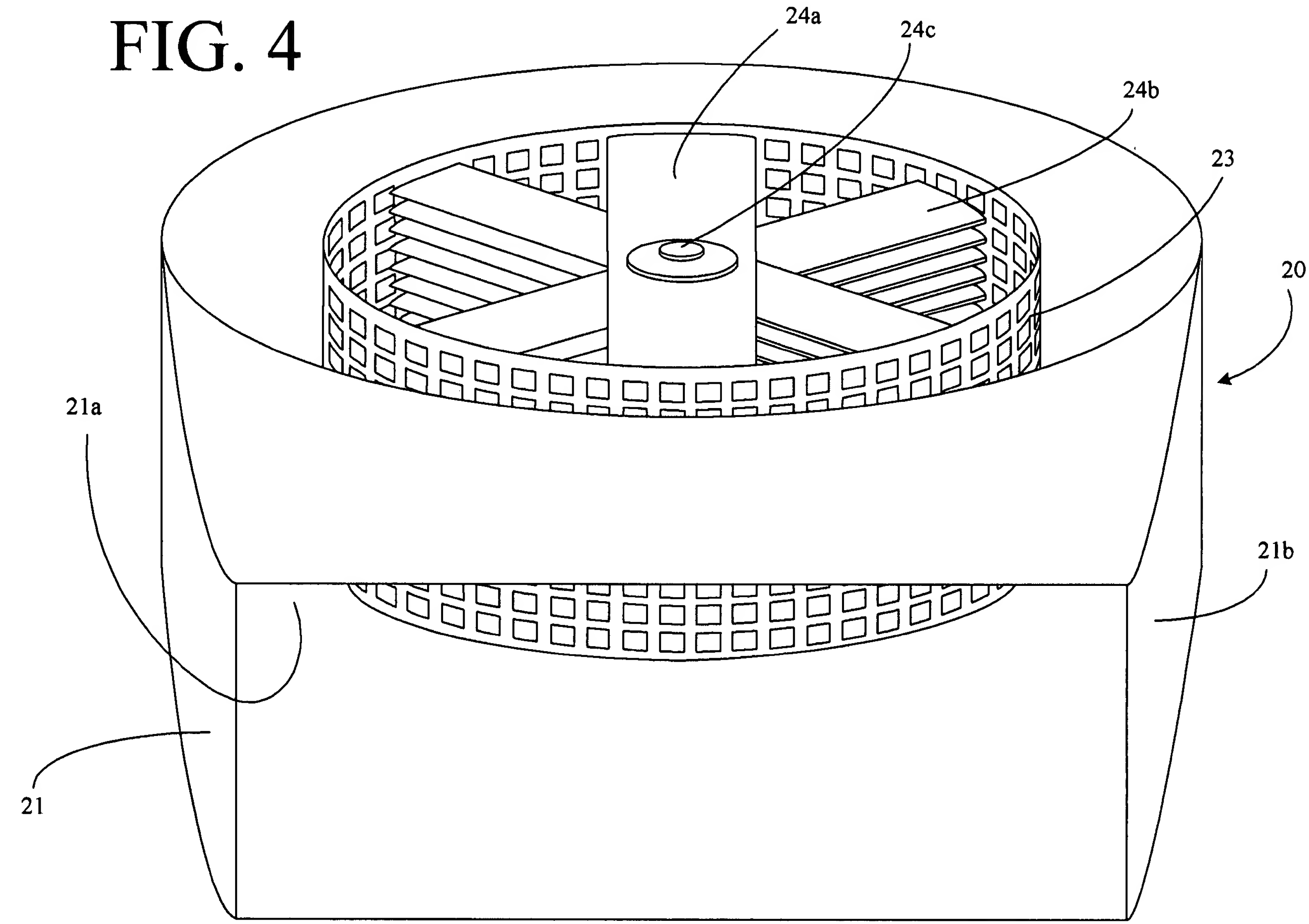


FIG. 4



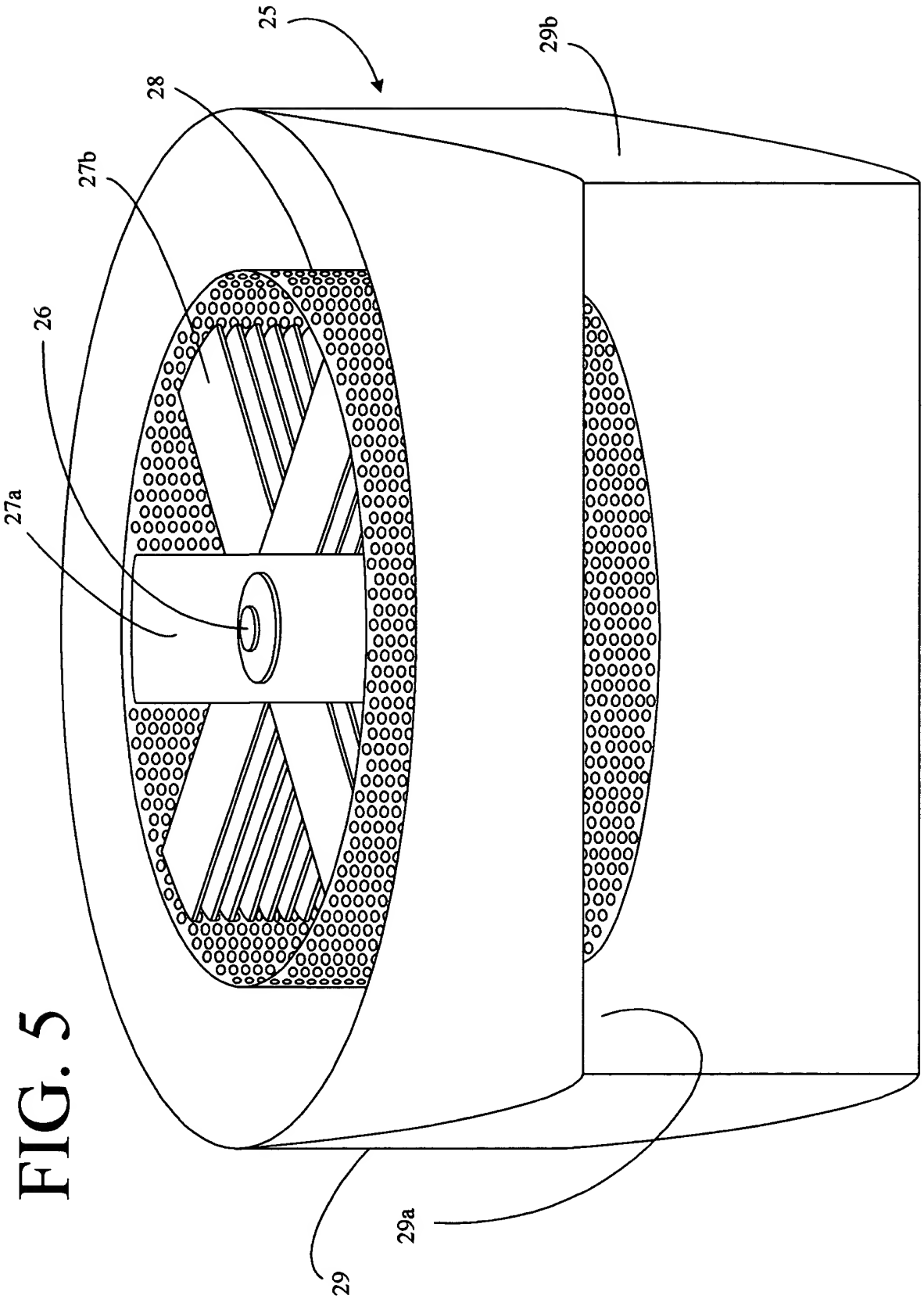


FIG. 5

FIG. 6

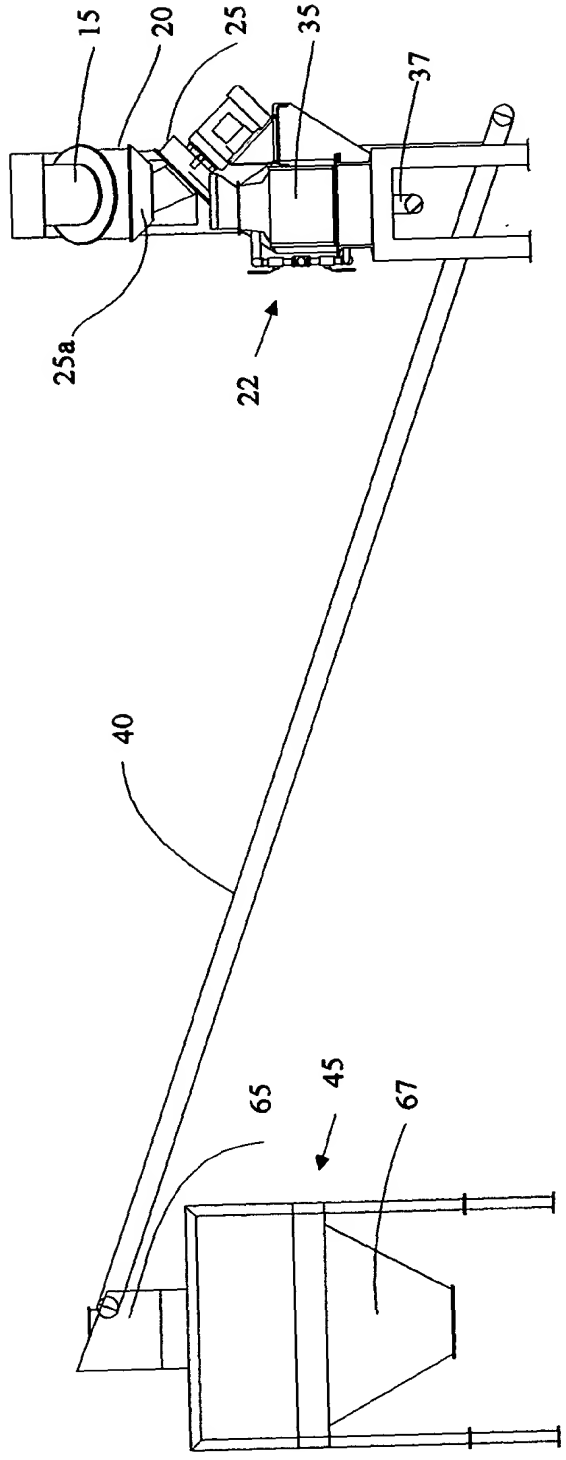


FIG. 7

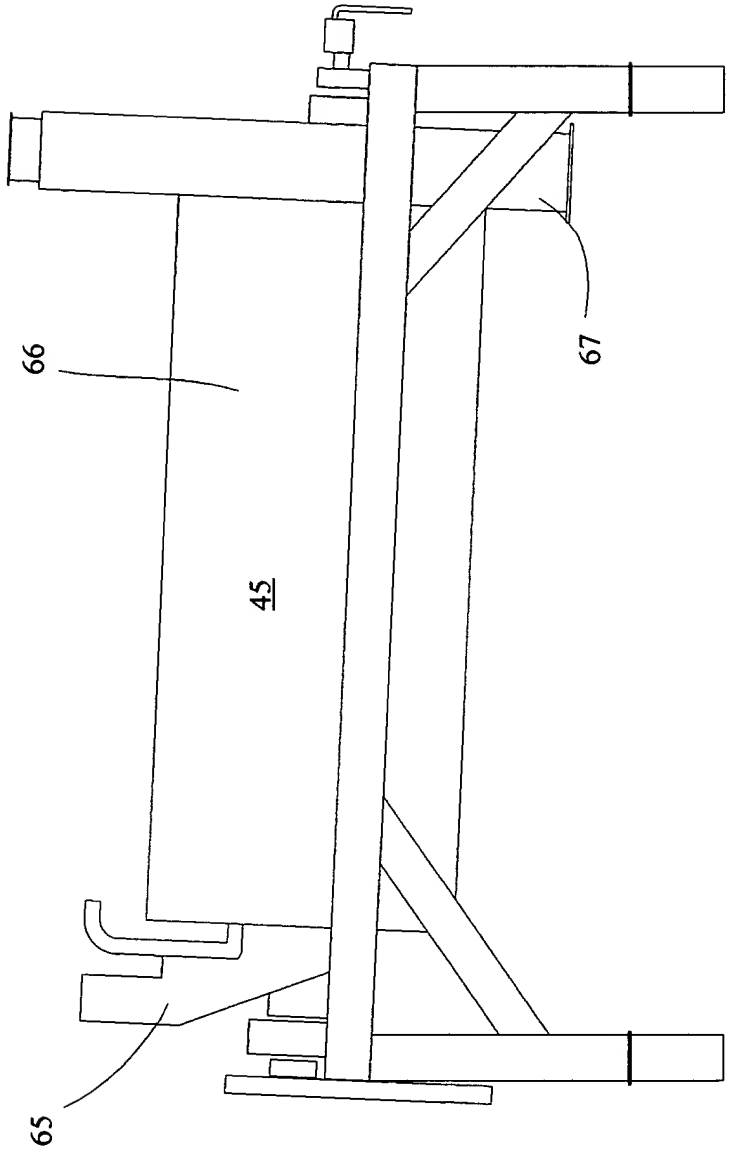


FIG. 8

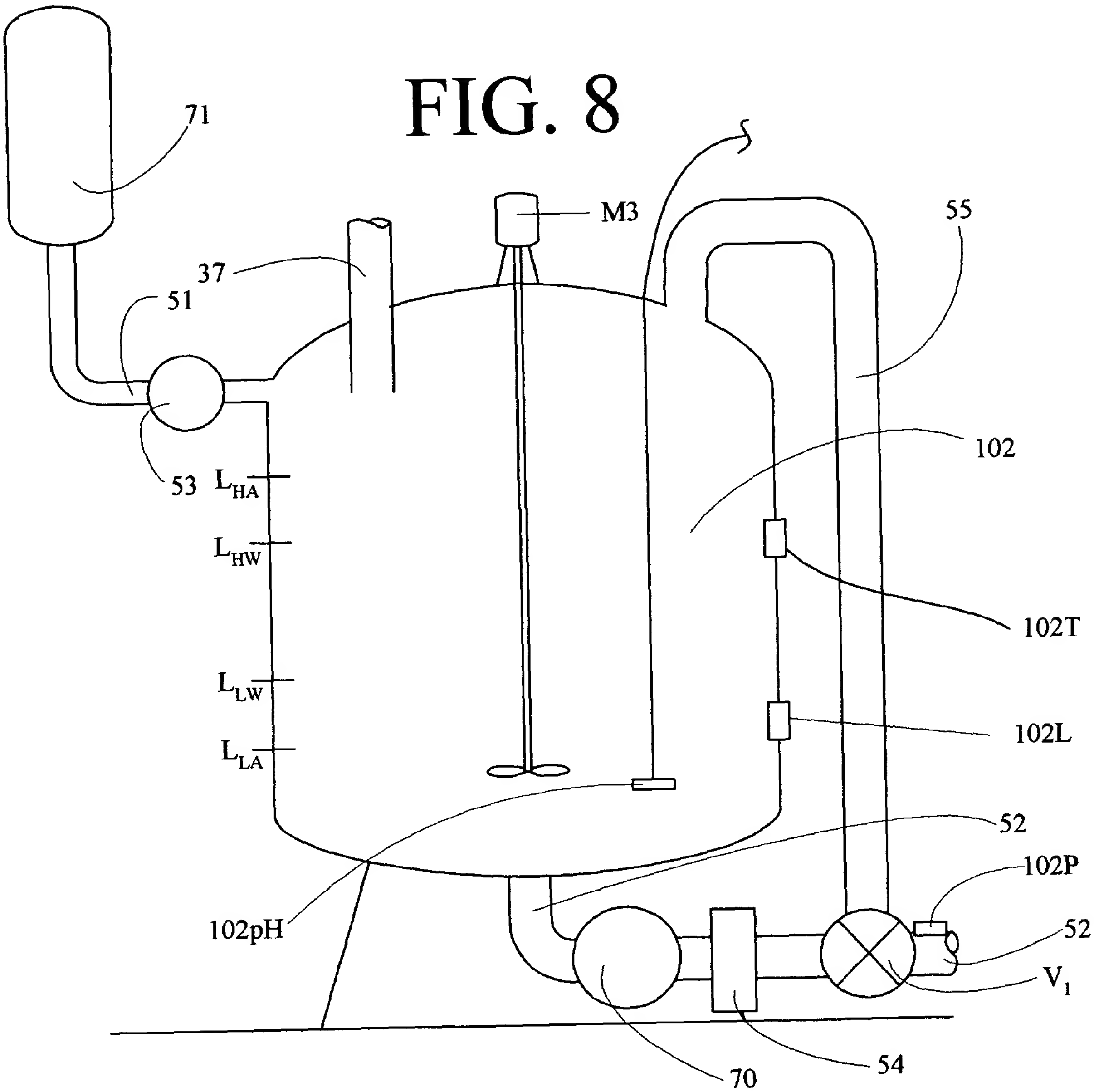

71
51
37
M3
55
53
L_{HA}
L_{HW}
L_{LW}
L_{LA}
102
102T
102L
52
102P
102pH
52
V_1
70
54

FIG. 9

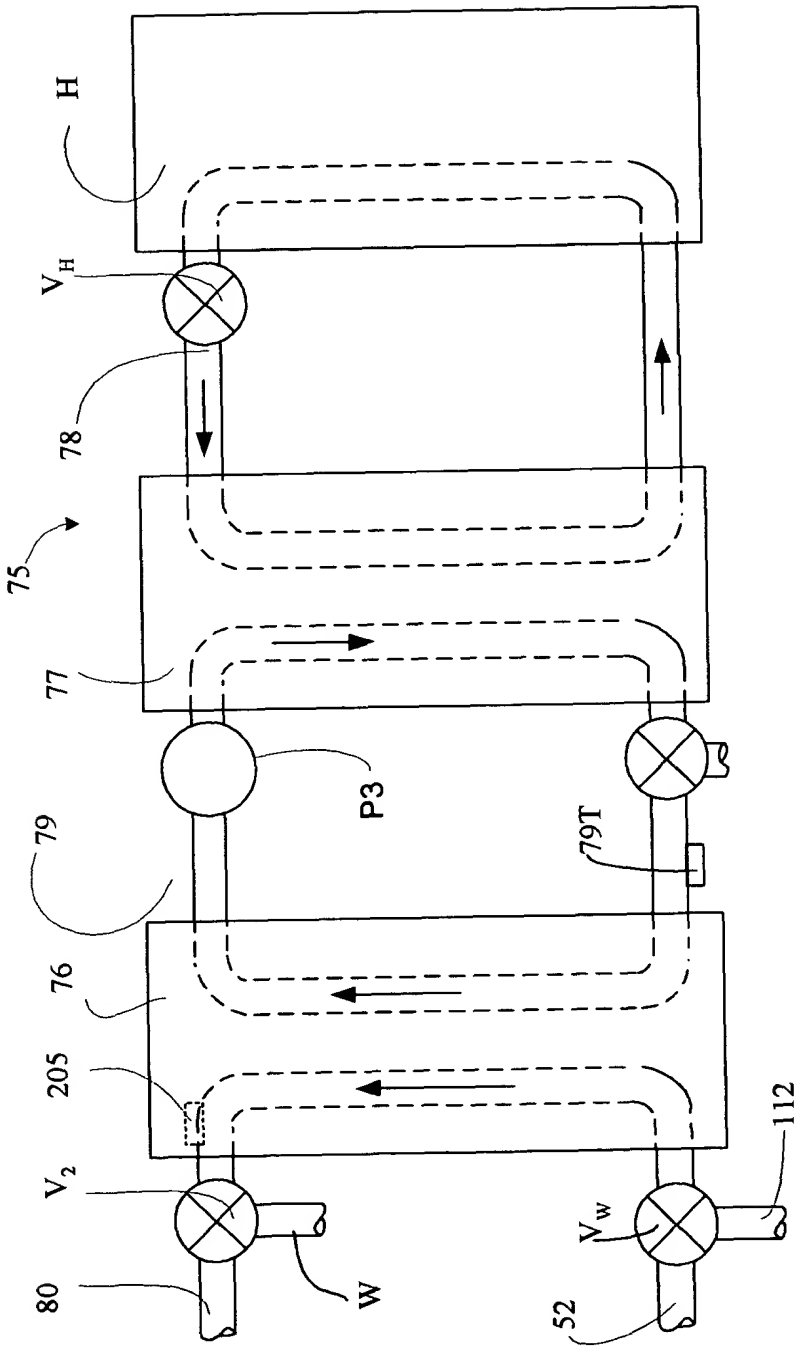


FIG. 10

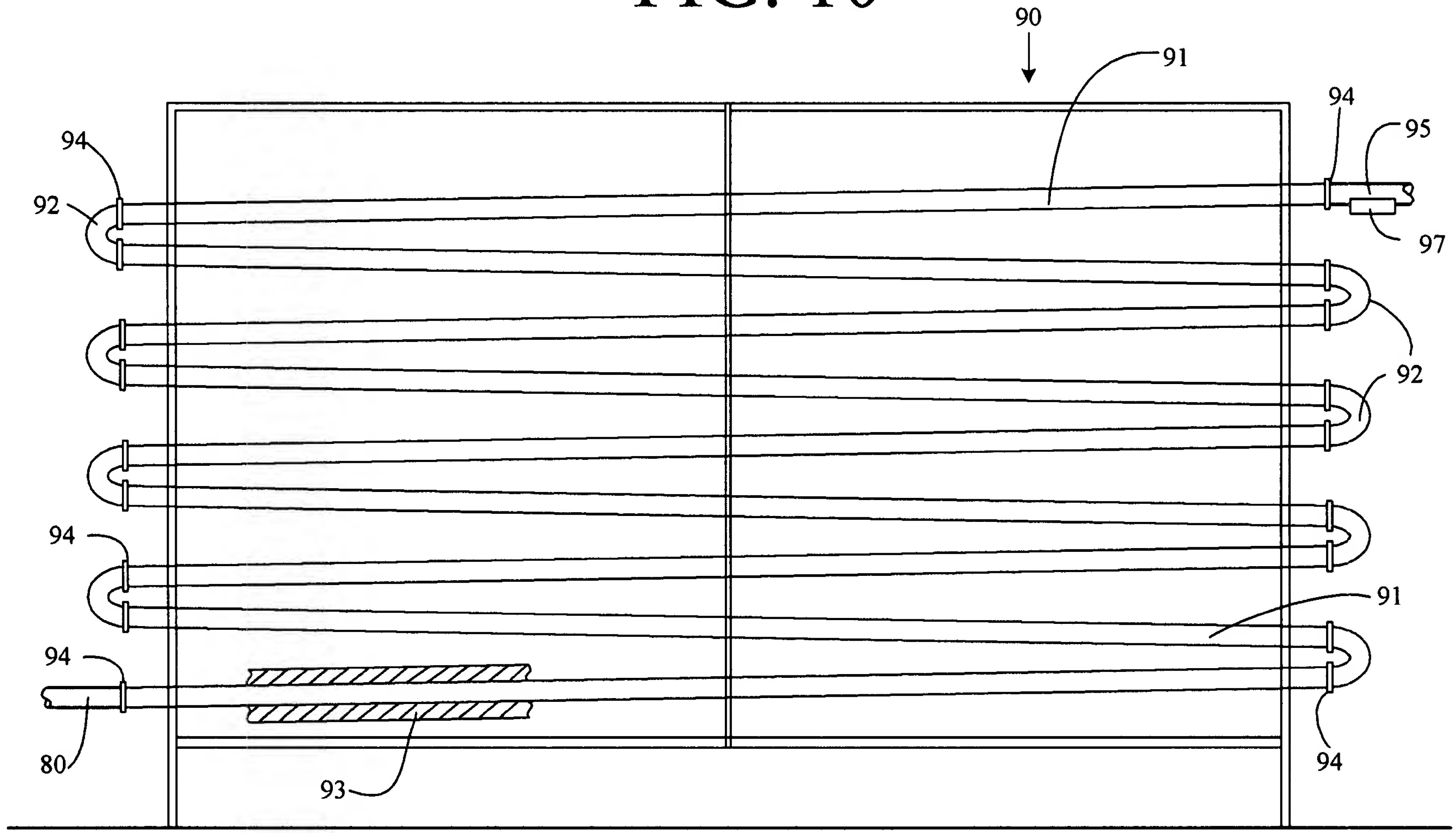


FIG. 11

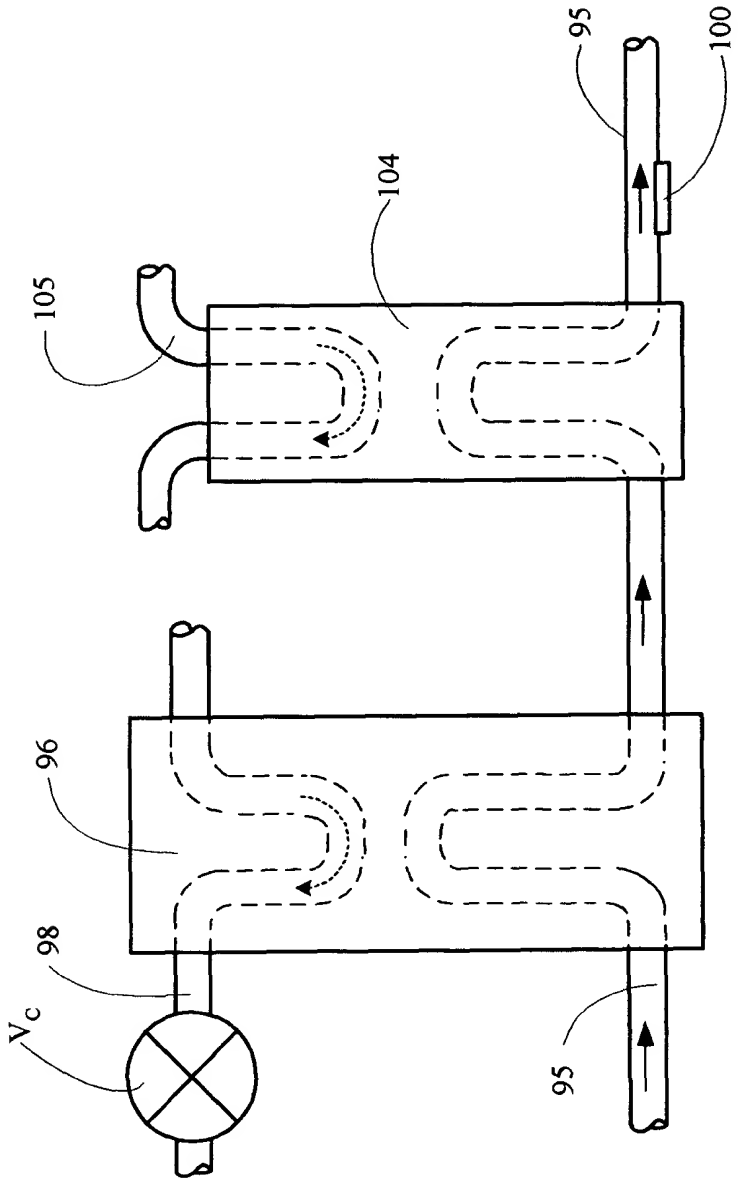


FIG. 12

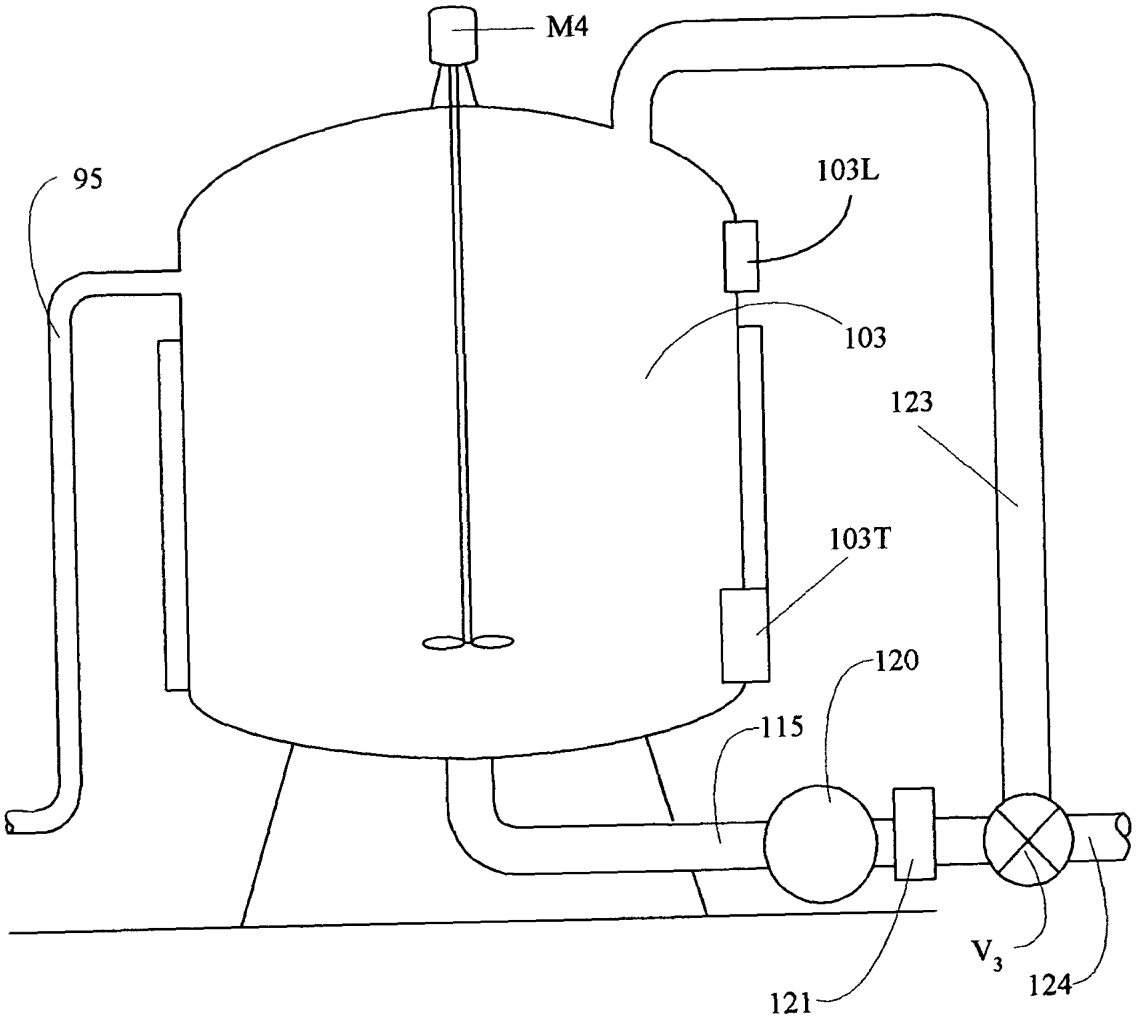


FIG. 13

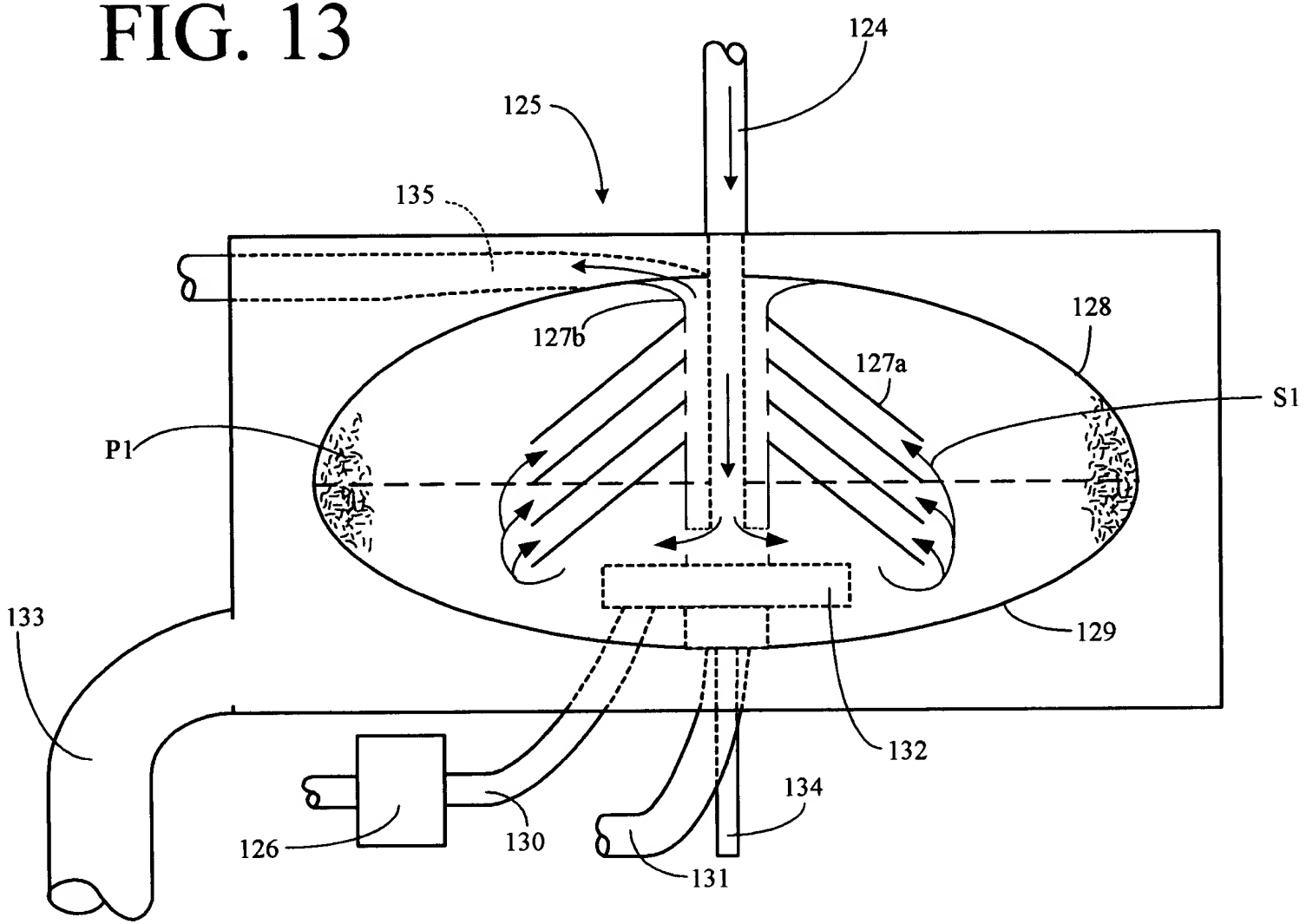


FIG. 14

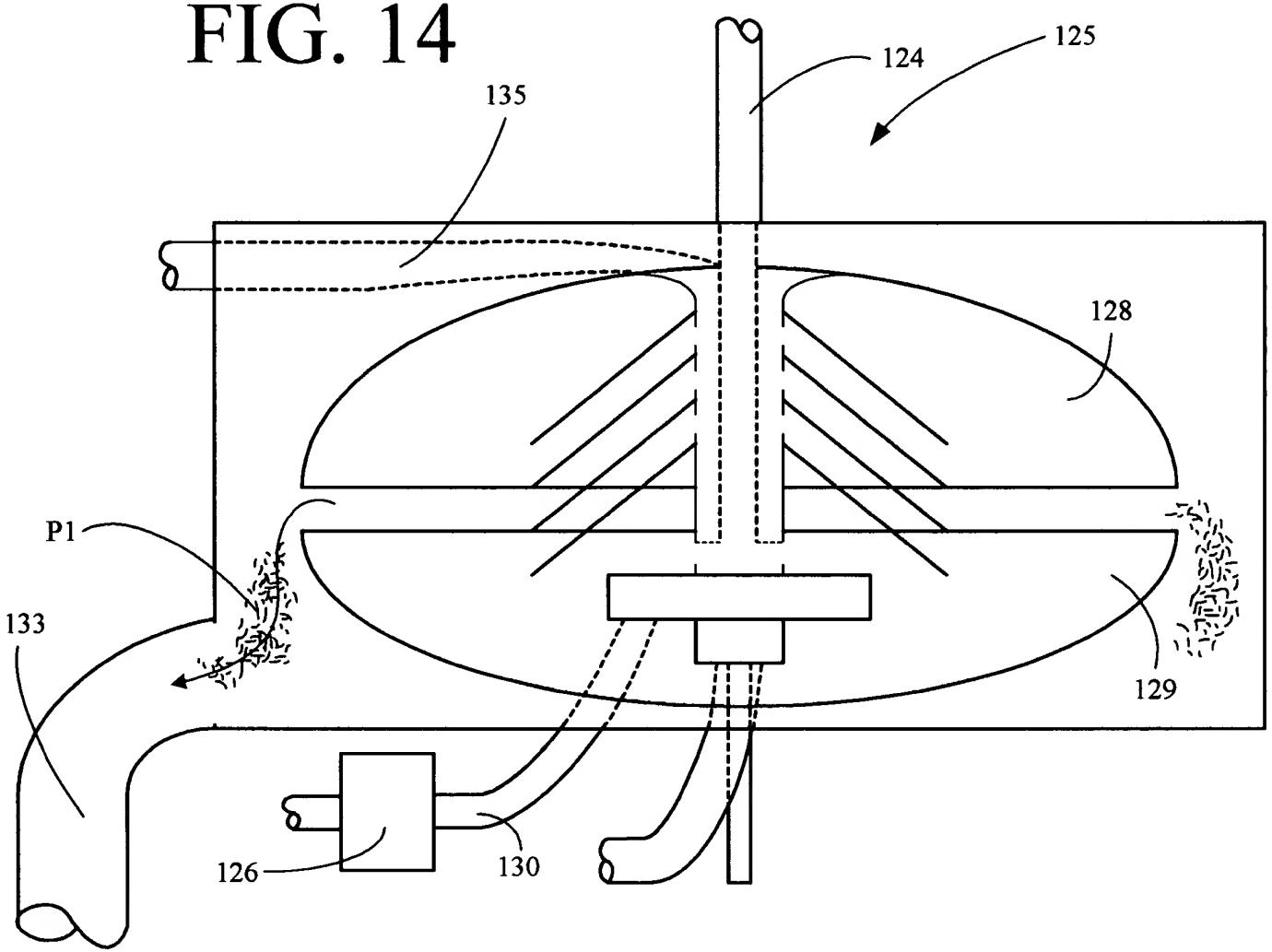


FIG. 15

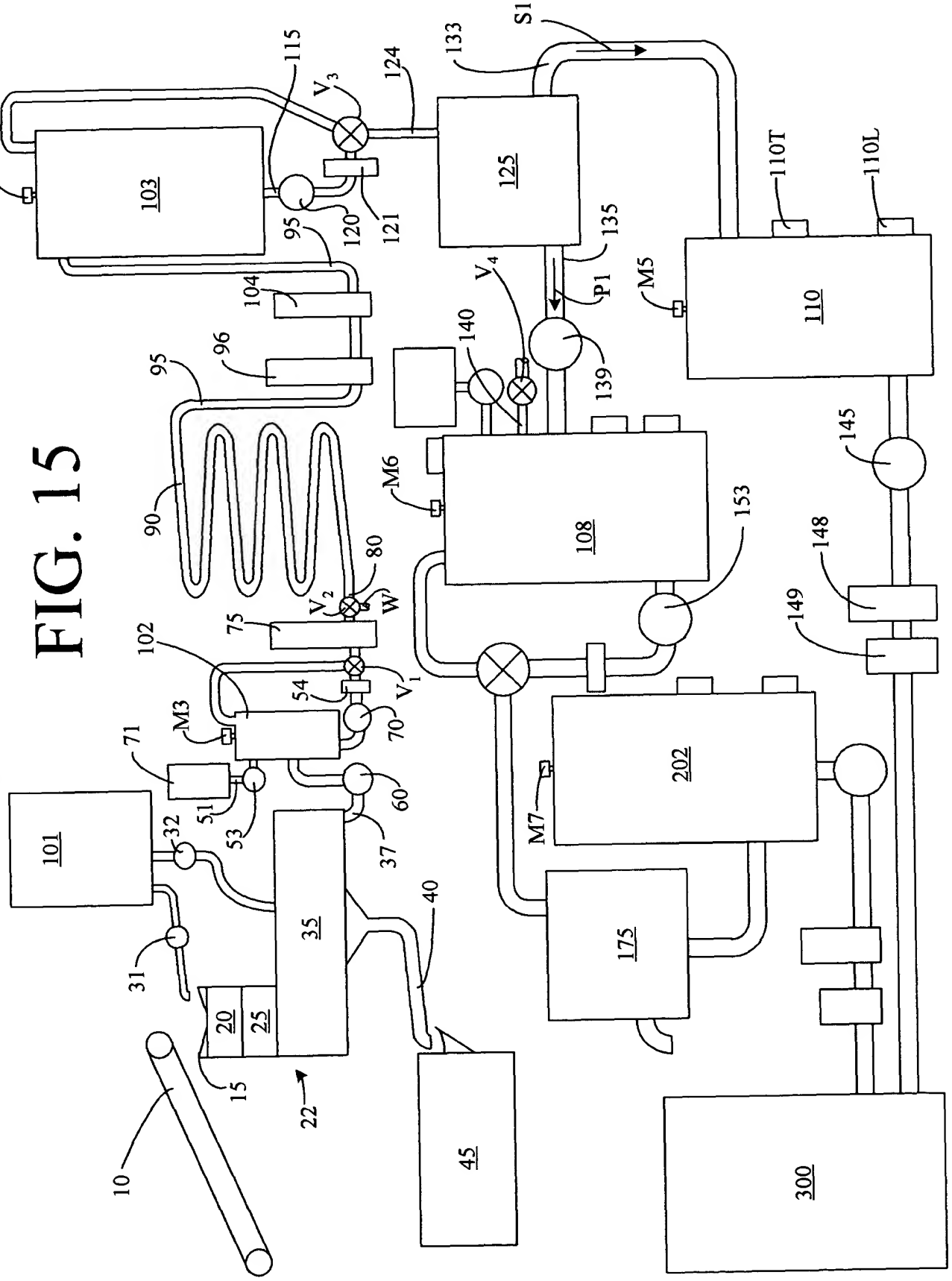

101
103
125
110
108
202
175
300
45
35
20
25
22
10
15
31
32
37
40
51
53
54
60
70
71
75
80
90
95
96
102
104
115
120
121
124
133
135
139
140
145
148
149
153
M3
M4
M5
M6
M7
P1
S1
110T
110L
V_1
V_2
V_3
V_4
W

FIG. 16

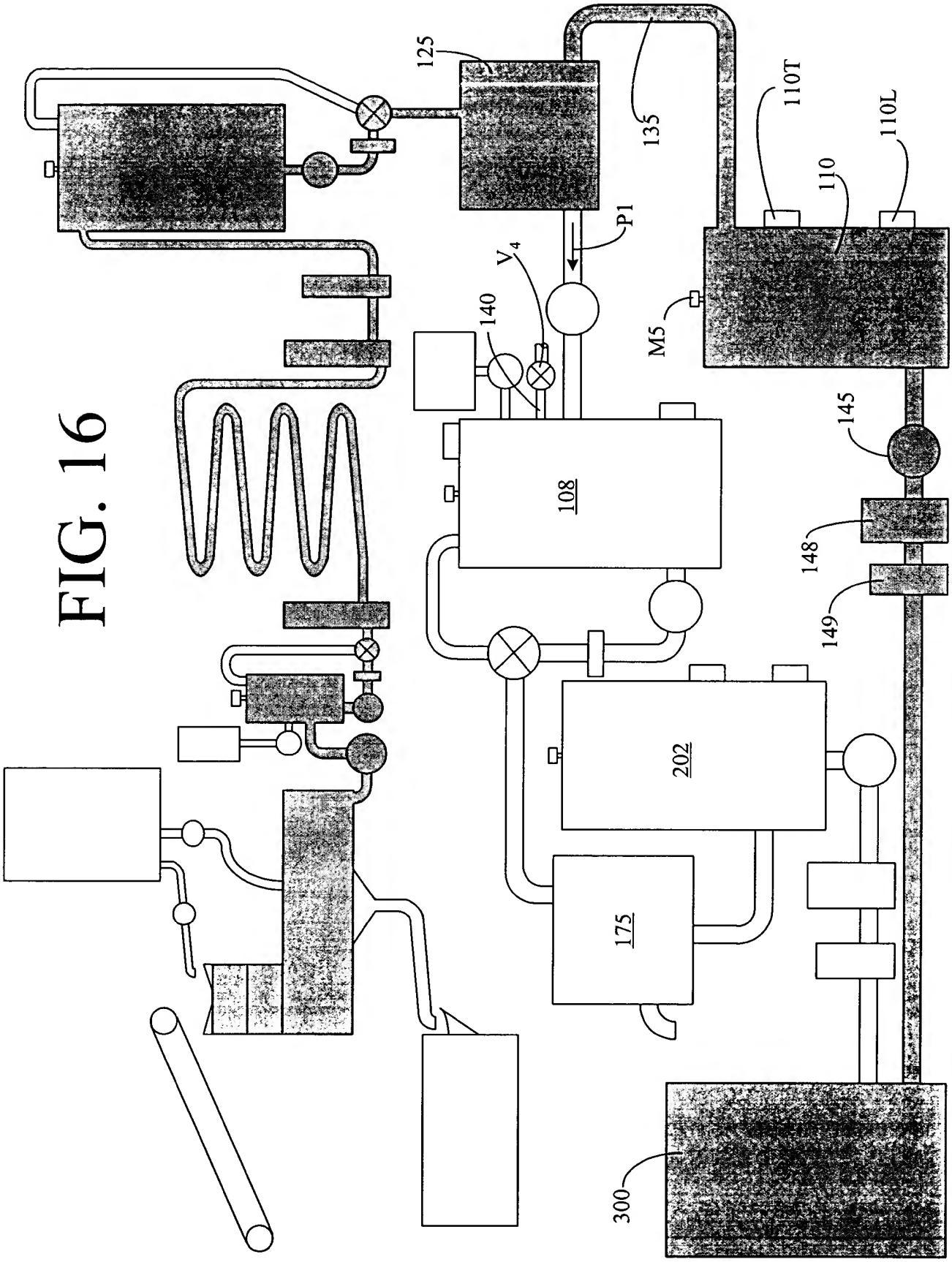


FIG. 17

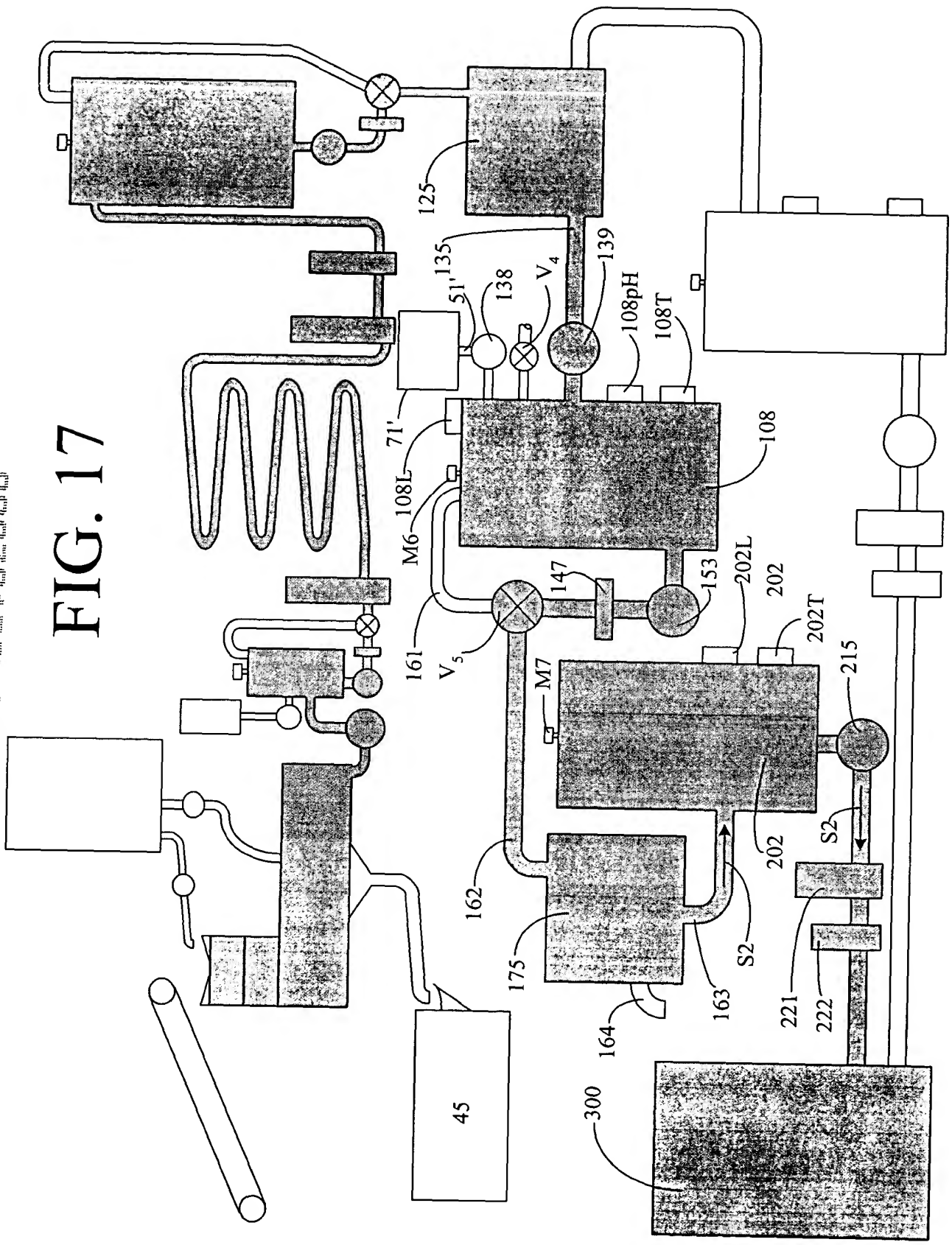

125
135
51'
138
V_4
139
108pH
108T
71'
108L
M6
108
147
153
202L
202
202T
161
V_5
M7
215
S2
162
175
163
164
221
222
300
45

FIG. 18

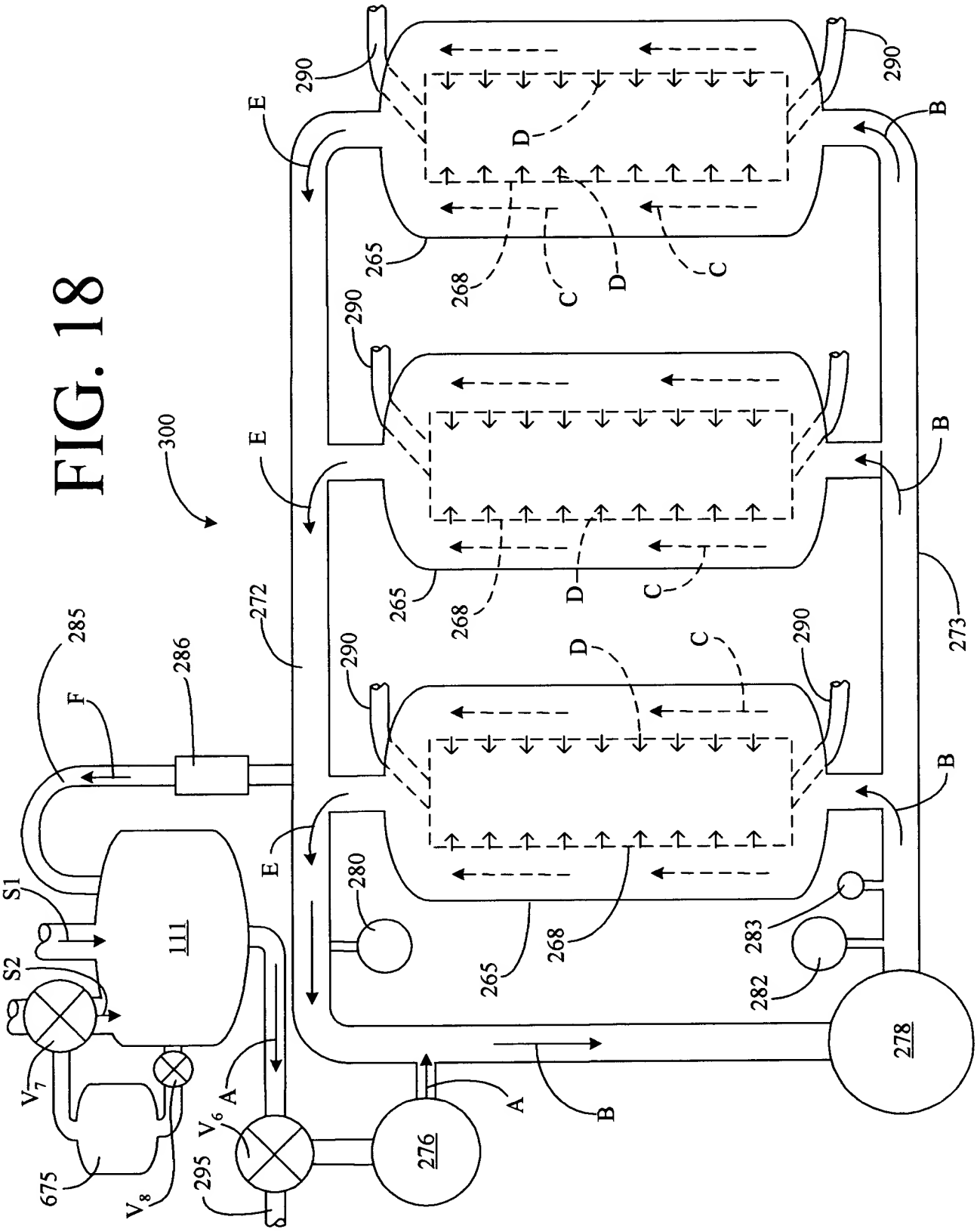


FIG. 19A

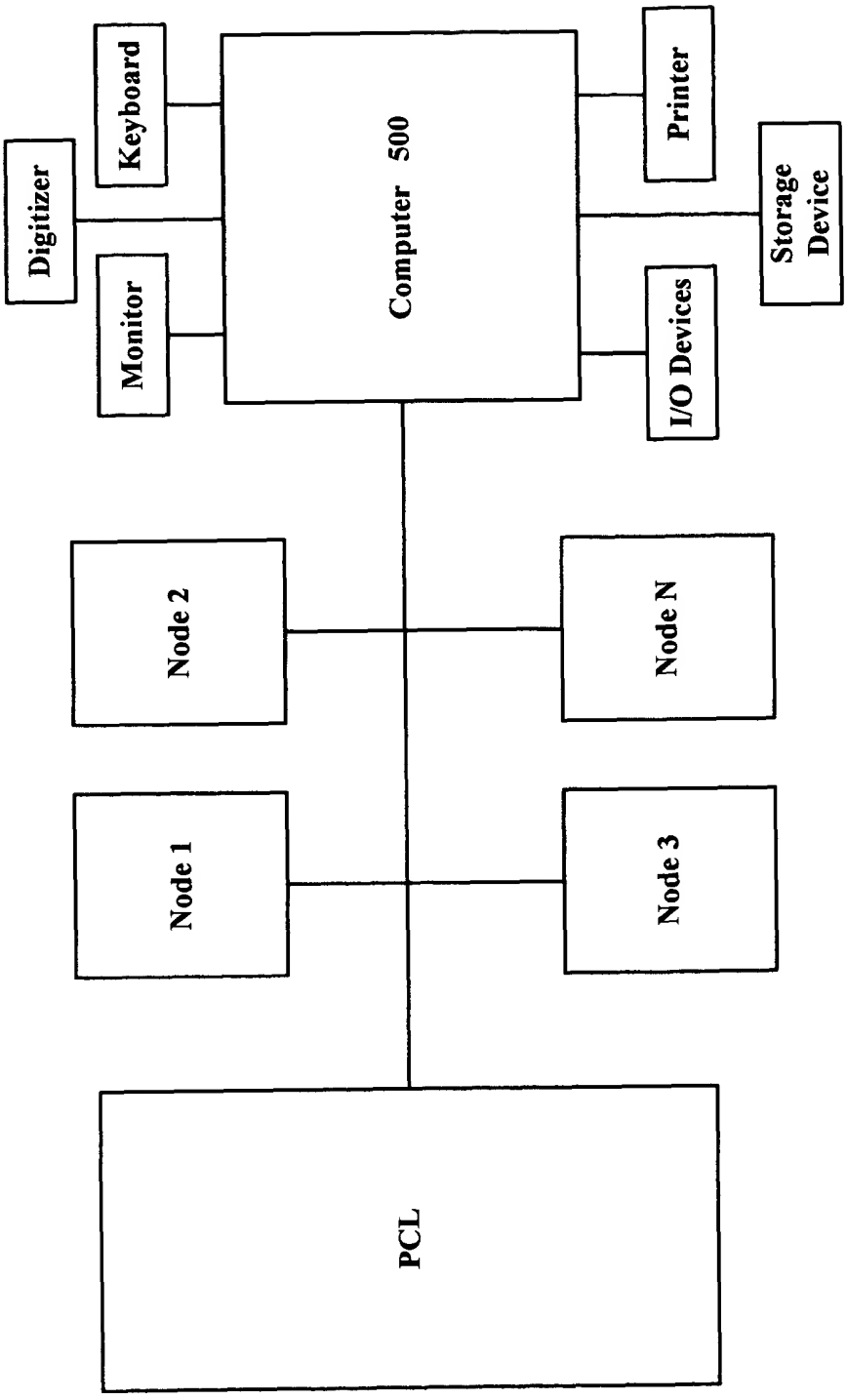


FIG. 19B

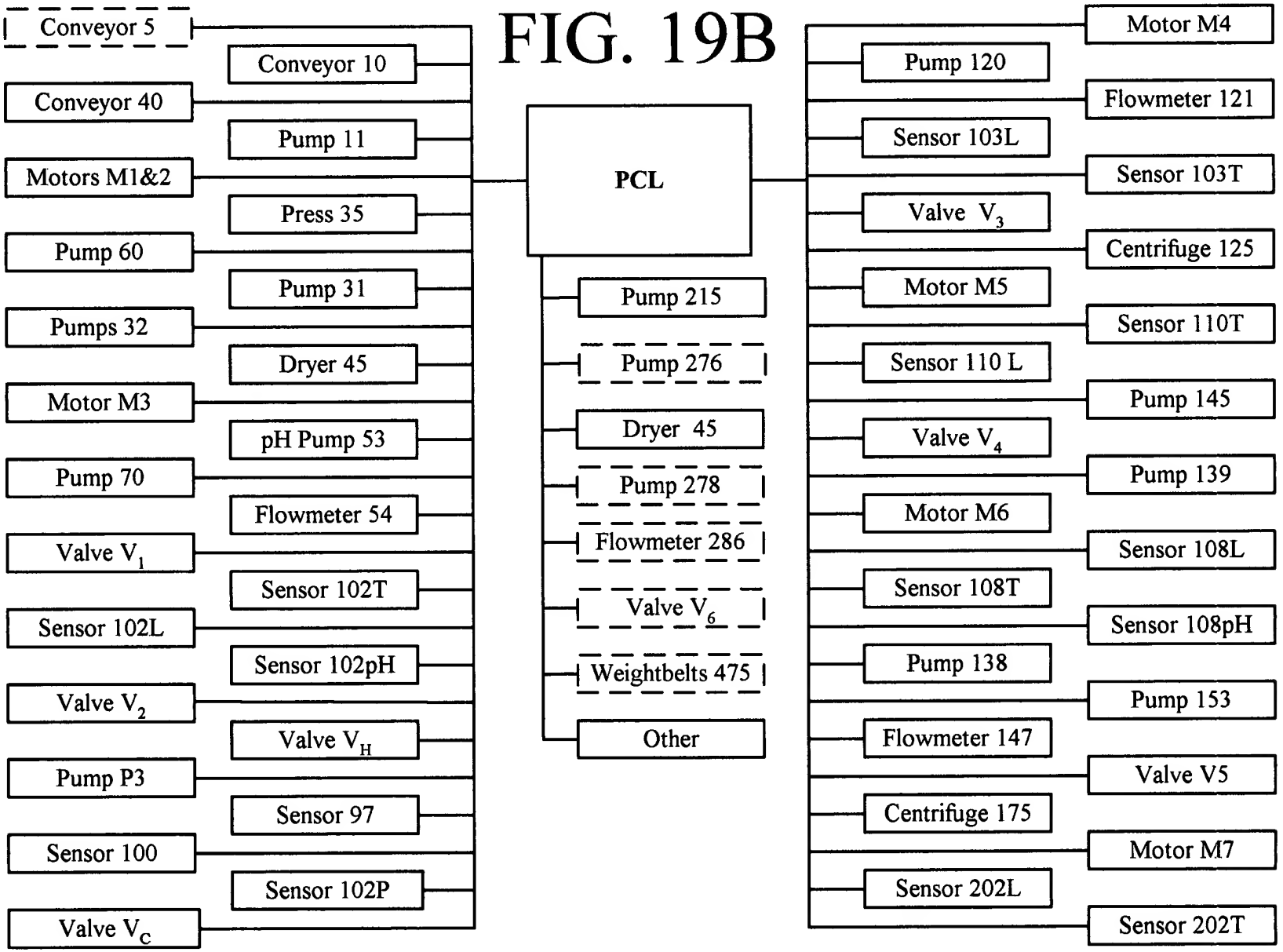


FIG. 20

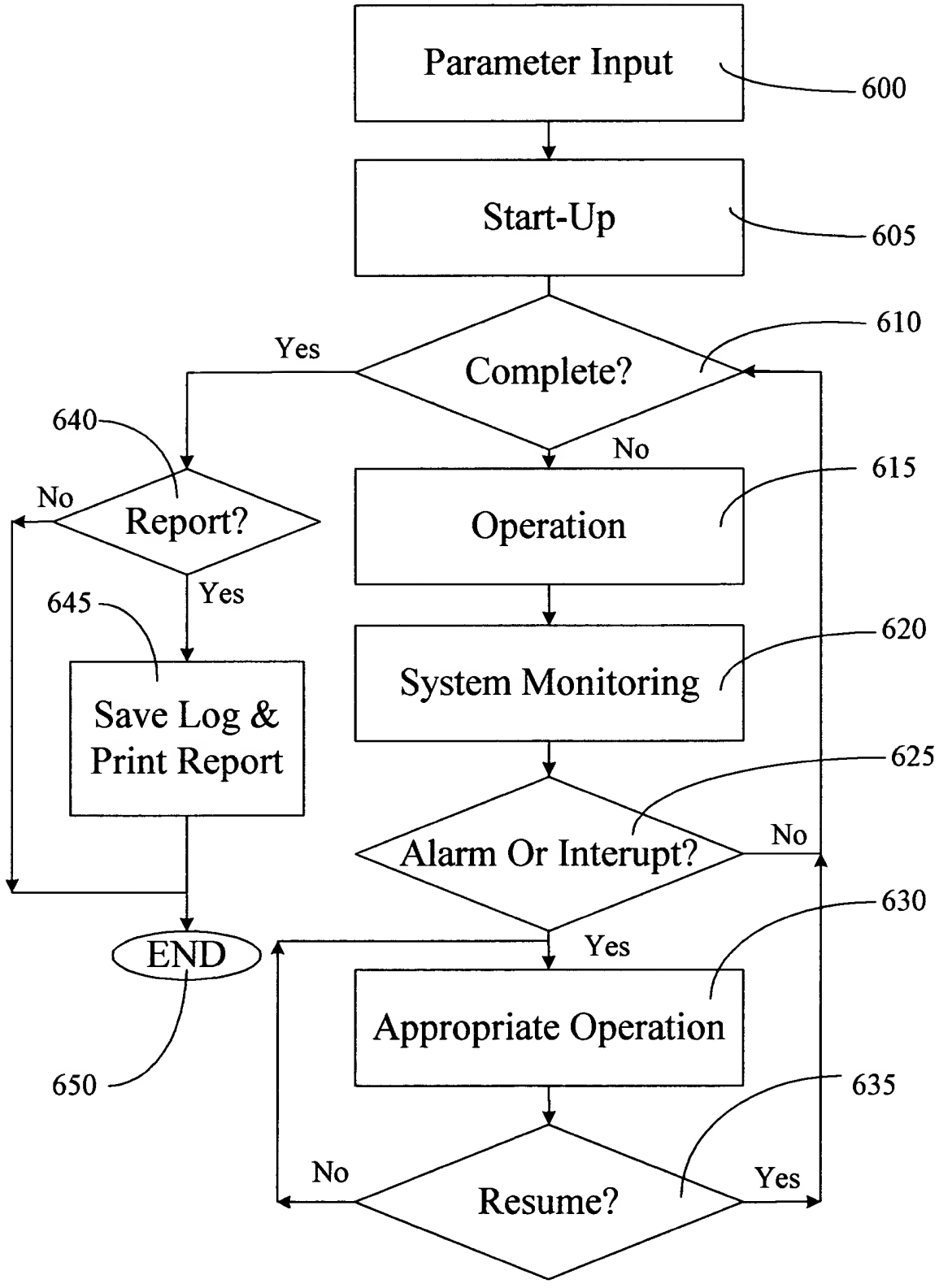

Parameter Input
600
Start-Up
605
Complete?
610
Yes
No
640
Report?
No
Yes
645
Save Log & Print Report
615
Operation
620
System Monitoring
625
Alarm Or Interupt?
No
Yes
630
Appropriate Operation
635
Resume?
No
Yes
END
650

FIG. 21

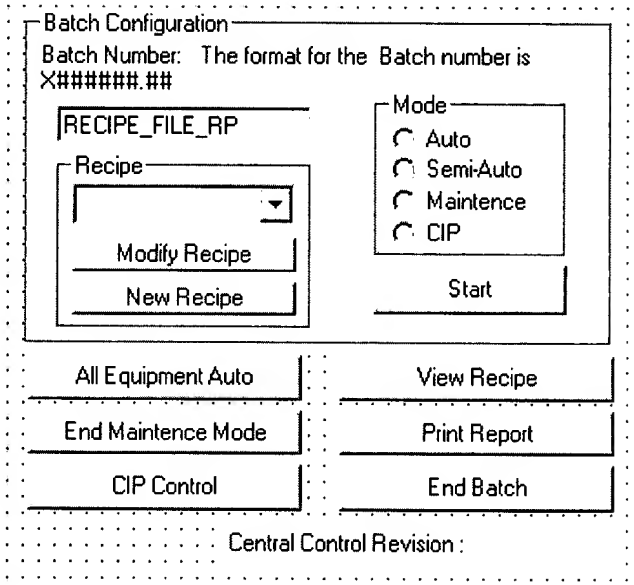

Batch Configuration
Batch Number: The format for the Batch number is X######.##
RECIPE_FILE_RP
Recipe
Modify Recipe
New Recipe
Mode
Auto
Semi-Auto
Maintence
CIP
Start
All Equipment Auto
End Maintence Mode
CIP Control
View Recipe
Print Report
End Batch
Central Control Revision :

FIG. 22

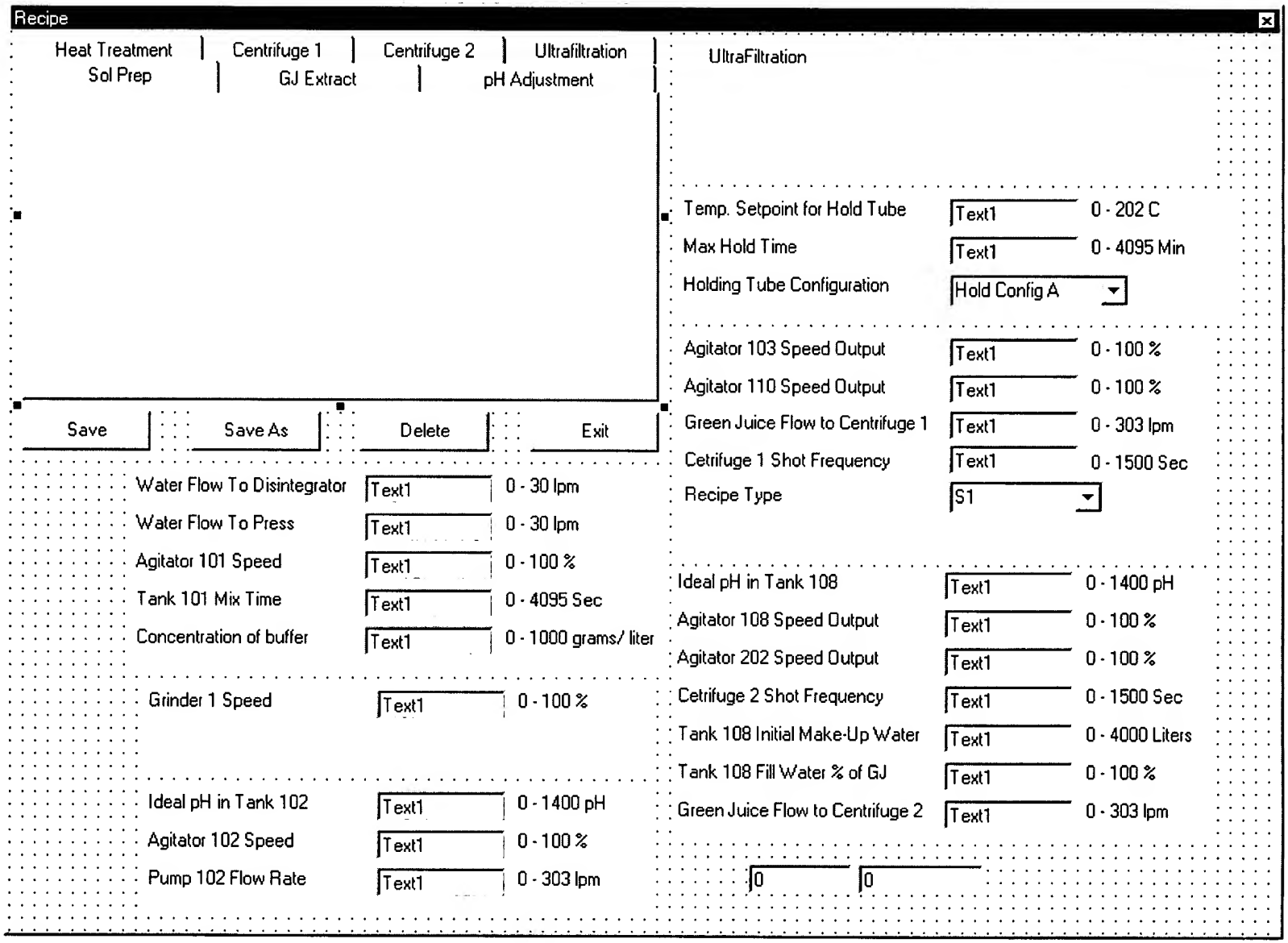


FIG. 23

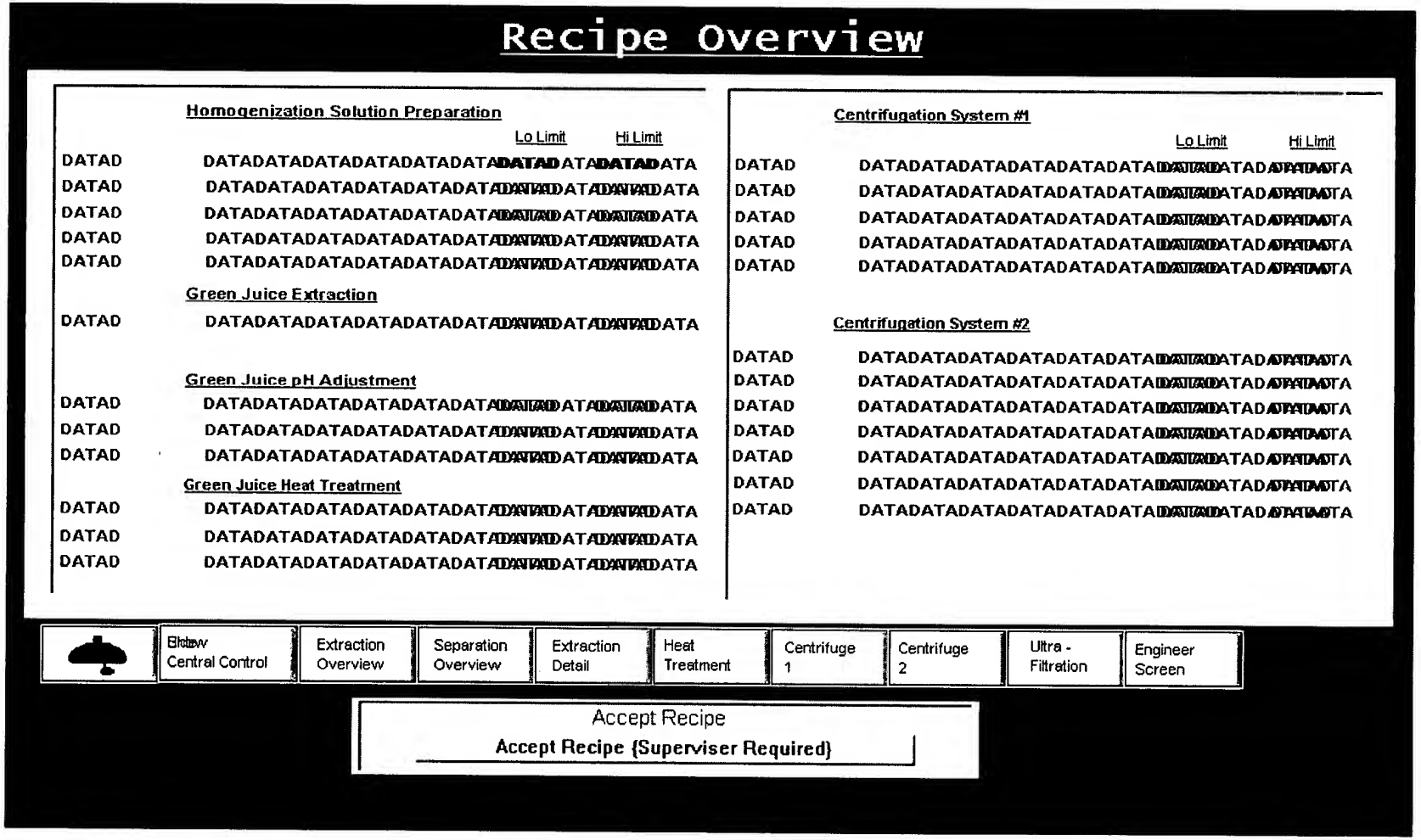


FIG. 24

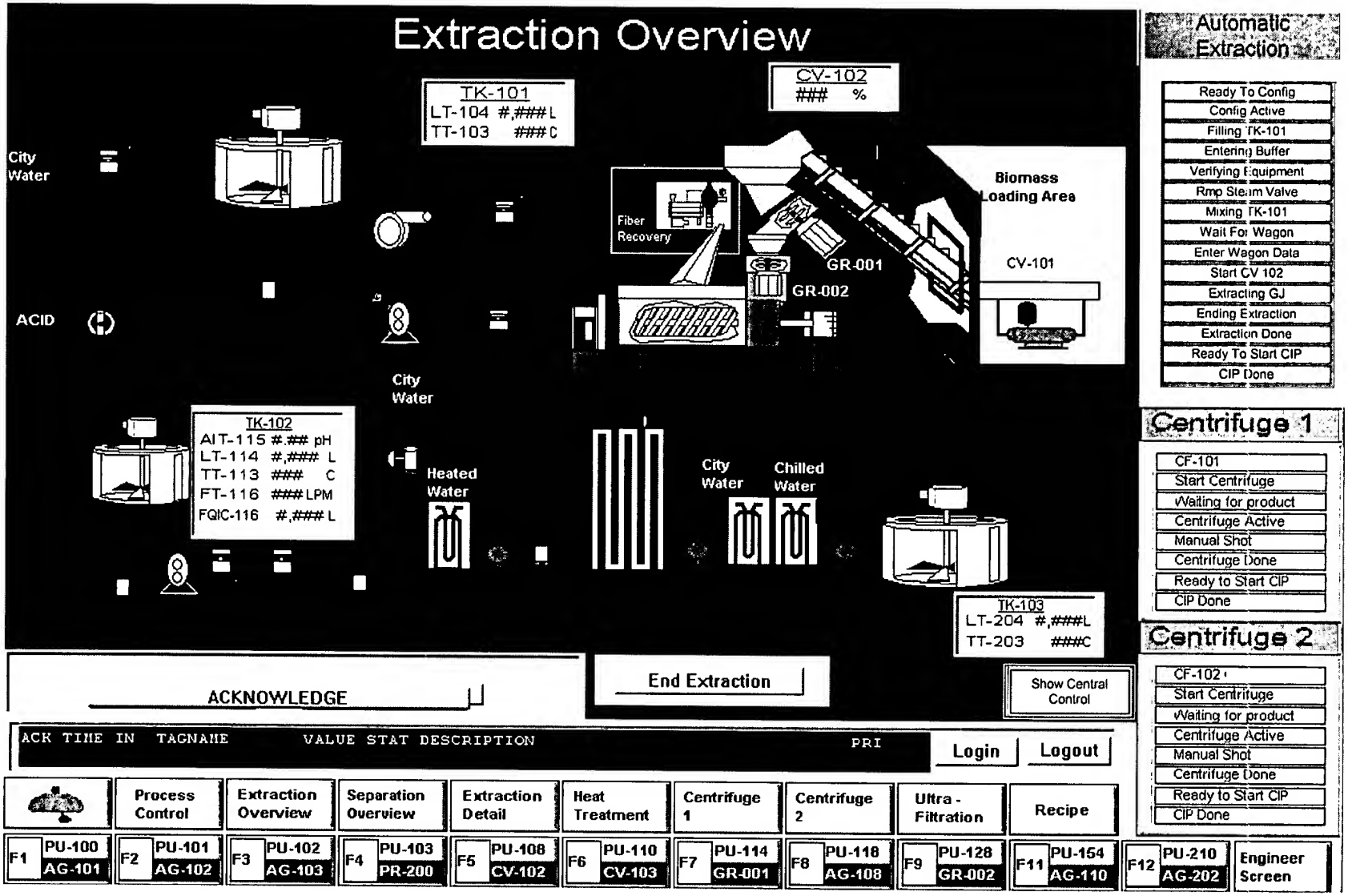

Extraction Overview
TK-101
LT-104 #,###L
TT-103 ###C
CV-102
%
City Water
ACID
Fiber Recovery
Biomass Loading Area
GR-001
GR-002
CV-101
City Water
TK-102
AIT-115 #.## pH
LT-114 #,### L
TT-113 ### C
FT-116 ### LPM
FQIC-116 #,### L
Heated Water
City Water
Chilled Water
TK-103
LT-204 #,###L
TT-203 ###C
Automatic Extraction
Ready To Config
Config Active
Filling TK-101
Entering Buffer
Verifying Equipment
Rmp Steam Valve
Mixing TK-101
Wait For Wagon
Enter Wagon Data
Start CV 102
Extracting GJ
Ending Extraction
Extraction Done
Ready To Start CIP
CIP Done
Centrifuge 1
CF-101
Start Centrifuge
Waiting for product
Centrifuge Active
Manual Shot
Centrifuge Done
Ready to Start CIP
CIP Done
Centrifuge 2
CF-102
Start Centrifuge
Waiting for product
Centrifuge Active
Manual Shot
Centrifuge Done
Ready to Start CIP
CIP Done
ACKNOWLEDGE
End Extraction
Show Central Control
ACK TIME IN TAGNAME VALUE STAT DESCRIPTION PRI
Login
Logout
Process Control
Extraction Overview
Separation Overview
Extraction Detail
Heat Treatment
Centrifuge 1
Centrifuge 2
Ultra - Filtration
Recipe
F1 PU-100 AG-101
F2 PU-101 AG-102
F3 PU-102 AG-103
F4 PU-103 PR-200
F5 PU-108 CV-102
F6 PU-110 CV-103
F7 PU-114 GR-001
F8 PU-118 AG-108
F9 PU-128 GR-002
F11 PU-154 AG-110
F12 PU-210 AG-202
Engineer Screen

FIG. 25

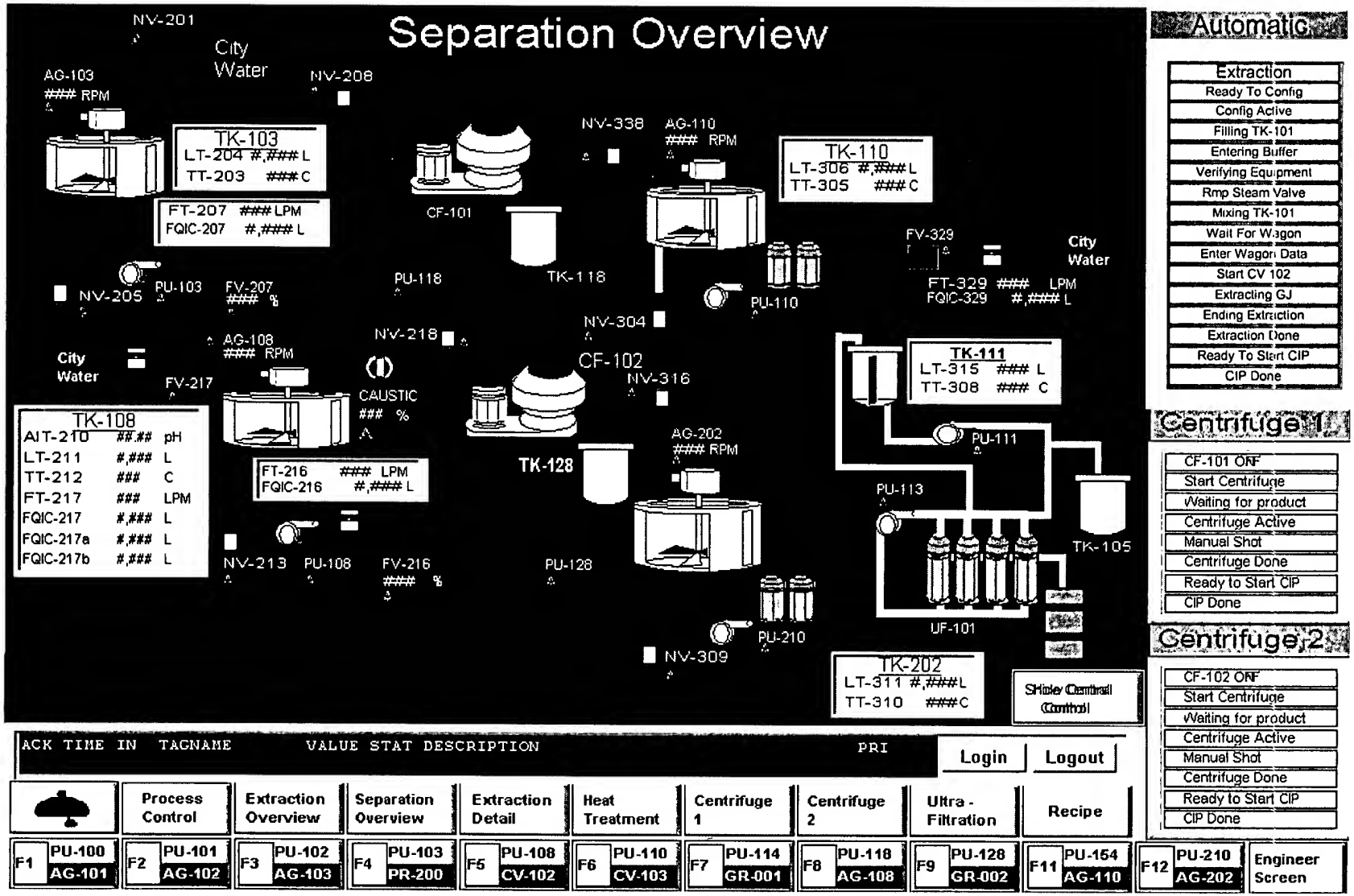

Separation Overview
NV-201
City Water
AG-103
RPM
NV-208
TK-103
LT-204 #,### L
TT-203 ### C
FT-207 ### LPM
FQIC-207 #,### L
NV-338
AG-110
RPM
TK-110
LT-306 #,### L
TT-305 ### C
CF-101
TK-118
PU-118
NV-205
PU-103
FV-207
%
PU-110
FV-329
City Water
FT-329 ### LPM
FQIC-329 #,### L
NV-304
NV-218
City Water
AG-108
RPM
FV-217
CAUSTIC
%
CF-102
NV-316
TK-111
LT-315 ### L
TT-308 ### C
PU-111
TK-108
AIT-210 ##.## pH
LT-211 #,### L
TT-212 ### C
FT-217 ### LPM
FQIC-217 #,### L
FQIC-217a #,### L
FQIC-217b #,### L
FT-216 ### LPM
FQIC-216 #,### L
TK-128
AG-202
RPM
PU-113
TK-105
NV-213
PU-108
FV-216
%
PU-128
UF-101
PU-210
NV-309
TK-202
LT-311 #,### L
TT-310 ### C
Shirley Central Control
Automatic
Extraction
Ready To Config
Config Active
Filling TK-101
Entering Buffer
Verifying Equipment
Rmp Steam Valve
Mixing TK-101
Wait For Wagon
Enter Wagon Data
Start CV 102
Extracting GJ
Ending Extraction
Extraction Done
Ready To Start CIP
CIP Done
Centrifuge 1
CF-101 ONF
Start Centrifuge
Waiting for product
Centrifuge Active
Manual Shot
Centrifuge Done
Ready to Start CIP
CIP Done
Centrifuge 2
CF-102 ONF
Start Centrifuge
Waiting for product
Centrifuge Active
Manual Shot
Centrifuge Done
Ready to Start CIP
CIP Done
ACK TIME IN TAGNAME VALUE STAT DESCRIPTION PRI
Login
Logout
Process Control
Extraction Overview
Separation Overview
Extraction Detail
Heat Treatment
Centrifuge 1
Centrifuge 2
Ultra - Filtration
Recipe
F1 PU-100 AG-101
F2 PU-101 AG-102
F3 PU-102 AG-103
F4 PU-103 PR-200
F5 PU-108 CV-102
F6 PU-110 CV-103
F7 PU-114 GR-001
F8 PU-118 AG-108
F9 PU-128 GR-002
F11 PU-154 AG-110
F12 PU-210 AG-202
Engineer Screen

FIG. 26

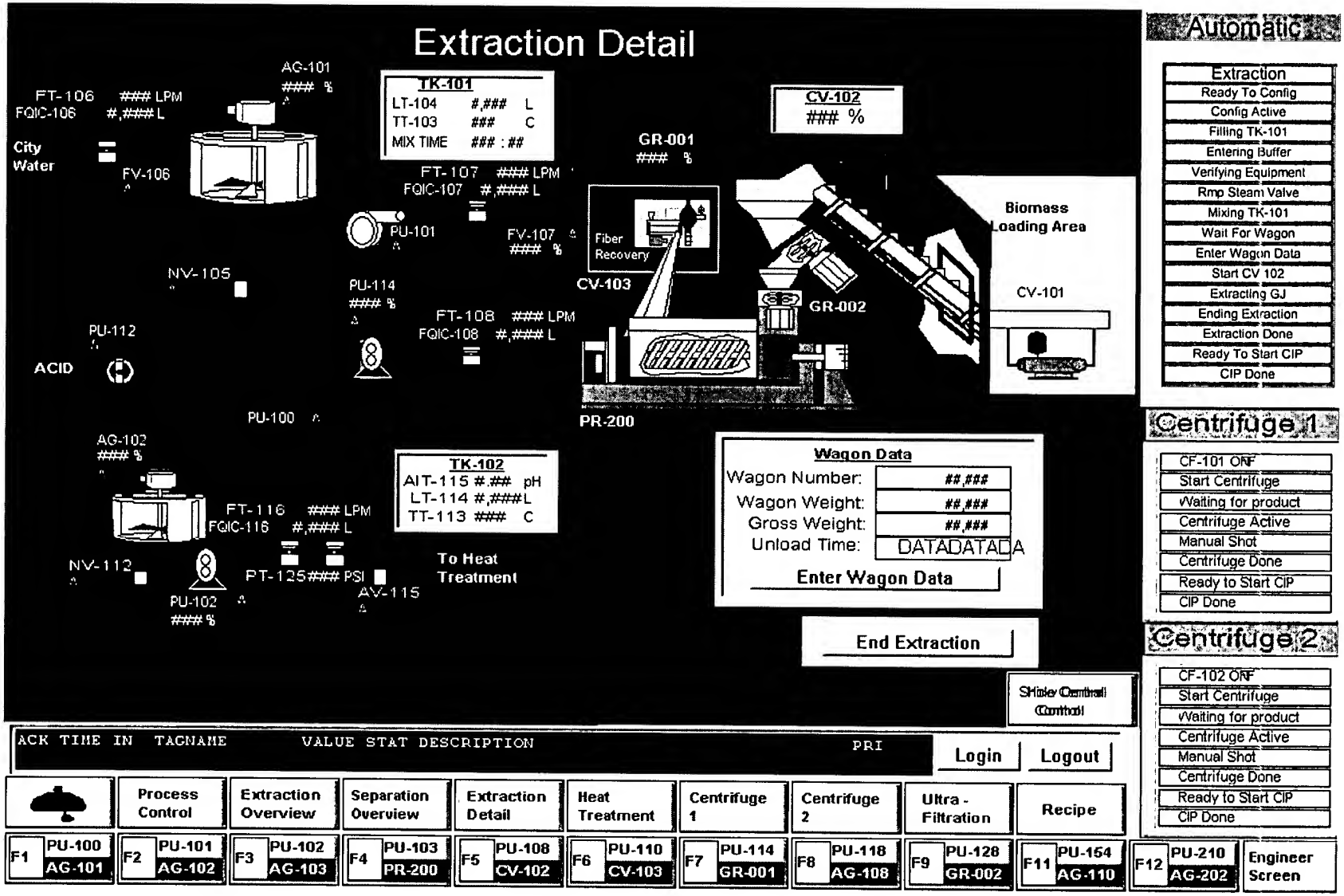

Extraction Detail
AG-101
%
FT-106 ### LPM
FQIC-106 #,### L
City Water
FV-106
TK-101
LT-104 #,### L
TT-103 ### C
MIX TIME ### : ##
FT-107 ### LPM
FQIC-107 #,### L
PU-101
FV-107
%
GR-001
%
CV-102
%
Fiber Recovery
CV-103
Biomass Loading Area
CV-101
GR-002
NV-105
PU-114
%
FT-108 ### LPM
FQIC-108 #,### L
PU-112
ACID
PU-100
PR-200
AG-102
%
TK-102
AIT-115 #.## pH
LT-114 #,###L
TT-113 ### C
FT-116 ### LPM
FQIC-116 #,### L
NV-112
PT-125 ### PSI
To Heat Treatment
PU-102
%
AV-115
Wagon Data
Wagon Number: ##,###
Wagon Weight: ##,###
Gross Weight: ##,###
Unload Time: DATADATADA
Enter Wagon Data
End Extraction
Automatic
Extraction
Ready To Config
Config Active
Filling TK-101
Entering Buffer
Verifying Equipment
Rmp Steam Valve
Mixing TK-101
Wait For Wagon
Enter Wagon Data
Start CV 102
Extracting GJ
Ending Extraction
Extraction Done
Ready To Start CIP
CIP Done
Centrifuge 1
CF-101 ONF
Start Centrifuge
Waiting for product
Centrifuge Active
Manual Shot
Centrifuge Done
Ready to Start CIP
CIP Done
Centrifuge 2
CF-102 ONF
Start Centrifuge
Waiting for product
Centrifuge Active
Manual Shot
Centrifuge Done
Ready to Start CIP
CIP Done
Shirley Central Control
ACK TIME IN TAGNAME VALUE STAT DESCRIPTION PRI
Login
Logout
Process Control
Extraction Overview
Separation Overview
Extraction Detail
Heat Treatment
Centrifuge 1
Centrifuge 2
Ultra - Filtration
Recipe
F1 PU-100 AG-101
F2 PU-101 AG-102
F3 PU-102 AG-103
F4 PU-103 PR-200
F5 PU-108 CV-102
F6 PU-110 CV-103
F7 PU-114 GR-001
F8 PU-118 AG-108
F9 PU-128 GR-002
F11 PU-154 AG-110
F12 PU-210 AG-202
Engineer Screen

FIG. 27

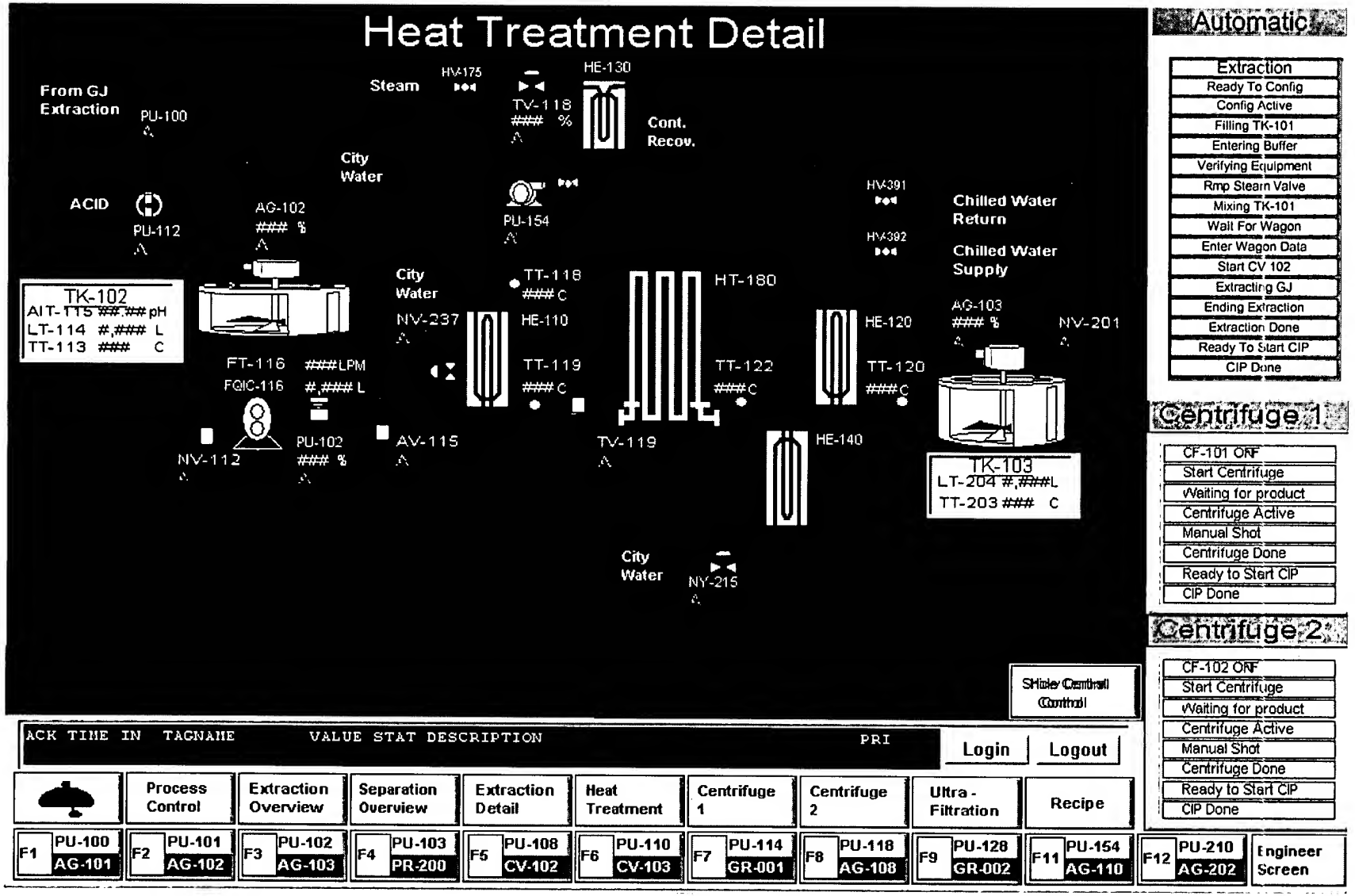

Heat Treatment Detail
From GJ Extraction
PU-100
Steam
HV-175
HE-130
TV-118 ### %
Cont. Recov.
City Water
ACID
PU-112
AG-102 ### %
PU-154
HV-391
HV-392
Chilled Water Return
Chilled Water Supply
TK-102
AIT-115 ##.## pH
LT-114 #,### L
TT-113 ### C
City Water
TT-118 ### C
HT-180
NV-237
HE-110
HE-120
AG-103 ### %
NV-201
FT-116 ###LPM
FQIC-116 #,### L
TT-119 ### C
TT-122 ### C
TT-120 ### C
NV-112
PU-102 ### %
AV-115
TV-119
HE-140
TK-103
LT-204 #,###L
TT-203 ### C
City Water
NV-215
Automatic
Extraction
Ready To Config
Config Active
Filling TK-101
Entering Buffer
Verifying Equipment
Rmp Steam Valve
Mixing TK-101
Wait For Wagon
Enter Wagon Data
Start CV 102
Extracting GJ
Ending Extraction
Extraction Done
Ready To Start CIP
CIP Done
Centrifuge 1
CF-101 ONF
Start Centrifuge
Waiting for product
Centrifuge Active
Manual Shot
Centrifuge Done
Ready to Start CIP
CIP Done
Centrifuge 2
CF-102 ONF
Start Centrifuge
Waiting for product
Centrifuge Active
Manual Shot
Centrifuge Done
Ready to Start CIP
CIP Done
Shake Control
ACK TIME IN TAGNAME VALUE STAT DESCRIPTION PRI
Login
Logout
Process Control
Extraction Overview
Separation Overview
Extraction Detail
Heat Treatment
Centrifuge 1
Centrifuge 2
Ultra - Filtration
Recipe
F1 PU-100 AG-101
F2 PU-101 AG-102
F3 PU-102 AG-103
F4 PU-103 PR-200
F5 PU-108 CV-102
F6 PU-110 CV-103
F7 PU-114 GR-001
F8 PU-118 AG-108
F9 PU-128 GR-002
F11 PU-154 AG-110
F12 PU-210 AG-202
Engineer Screen

FIG. 28

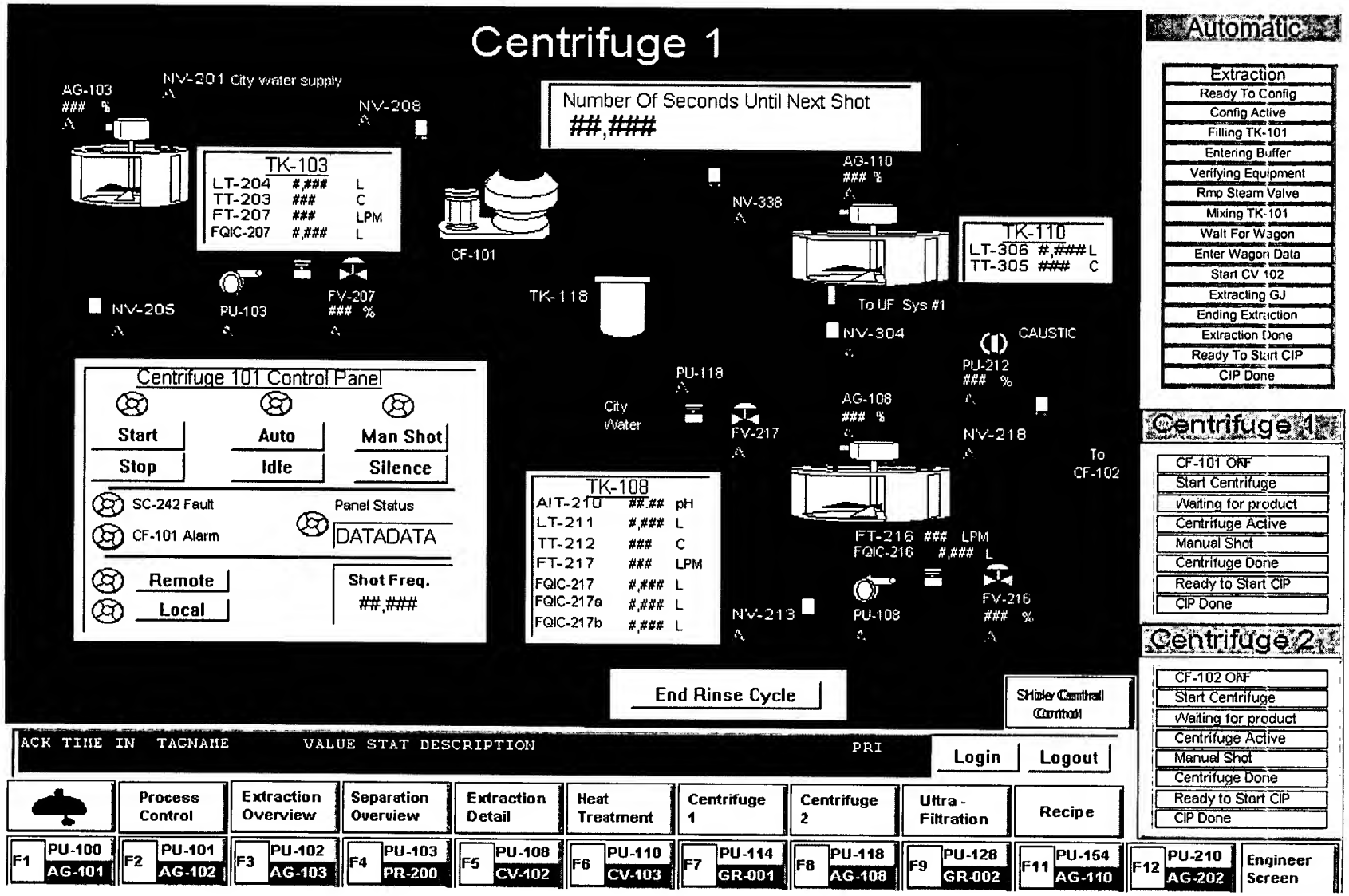


FIG. 29

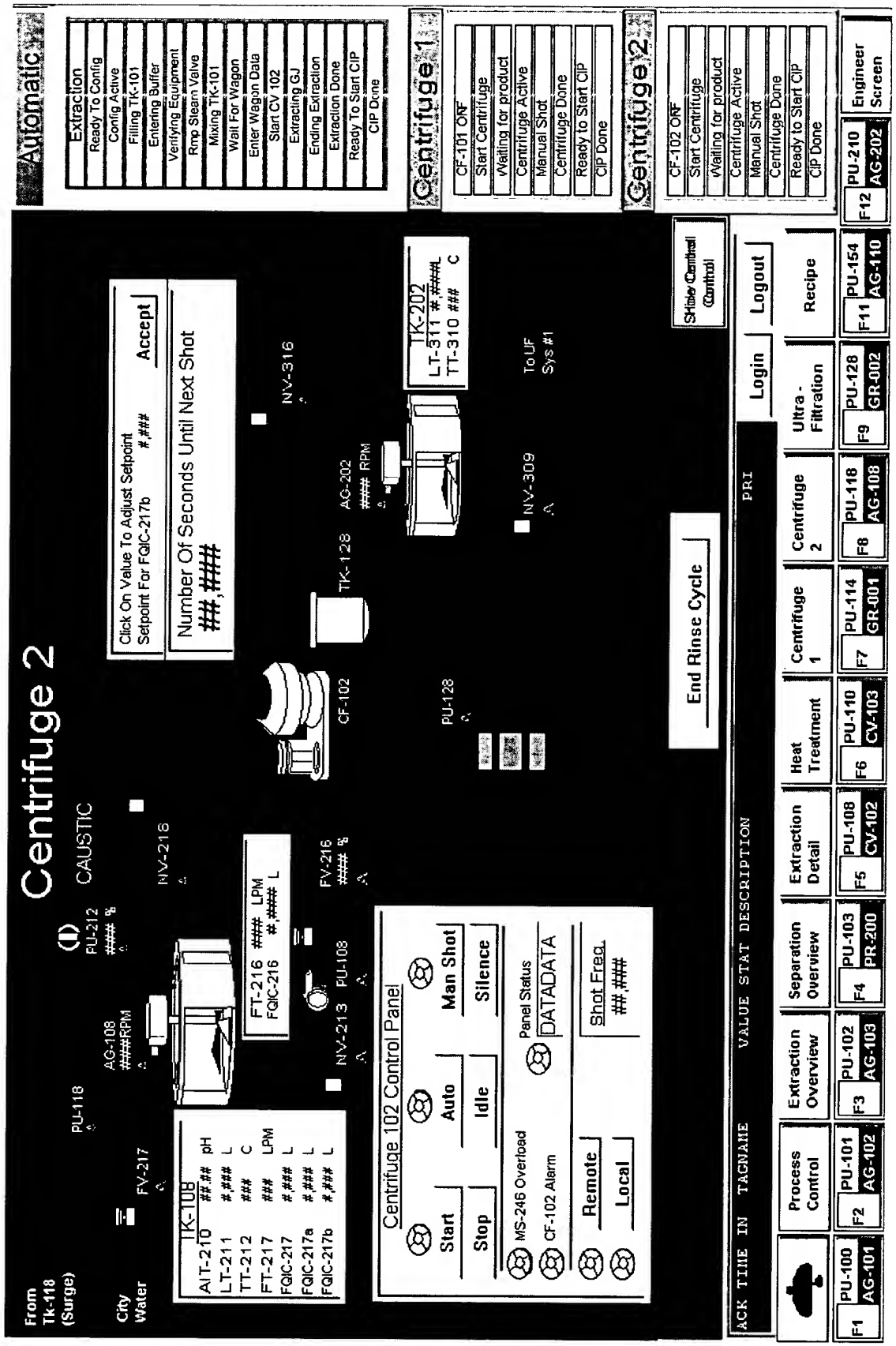
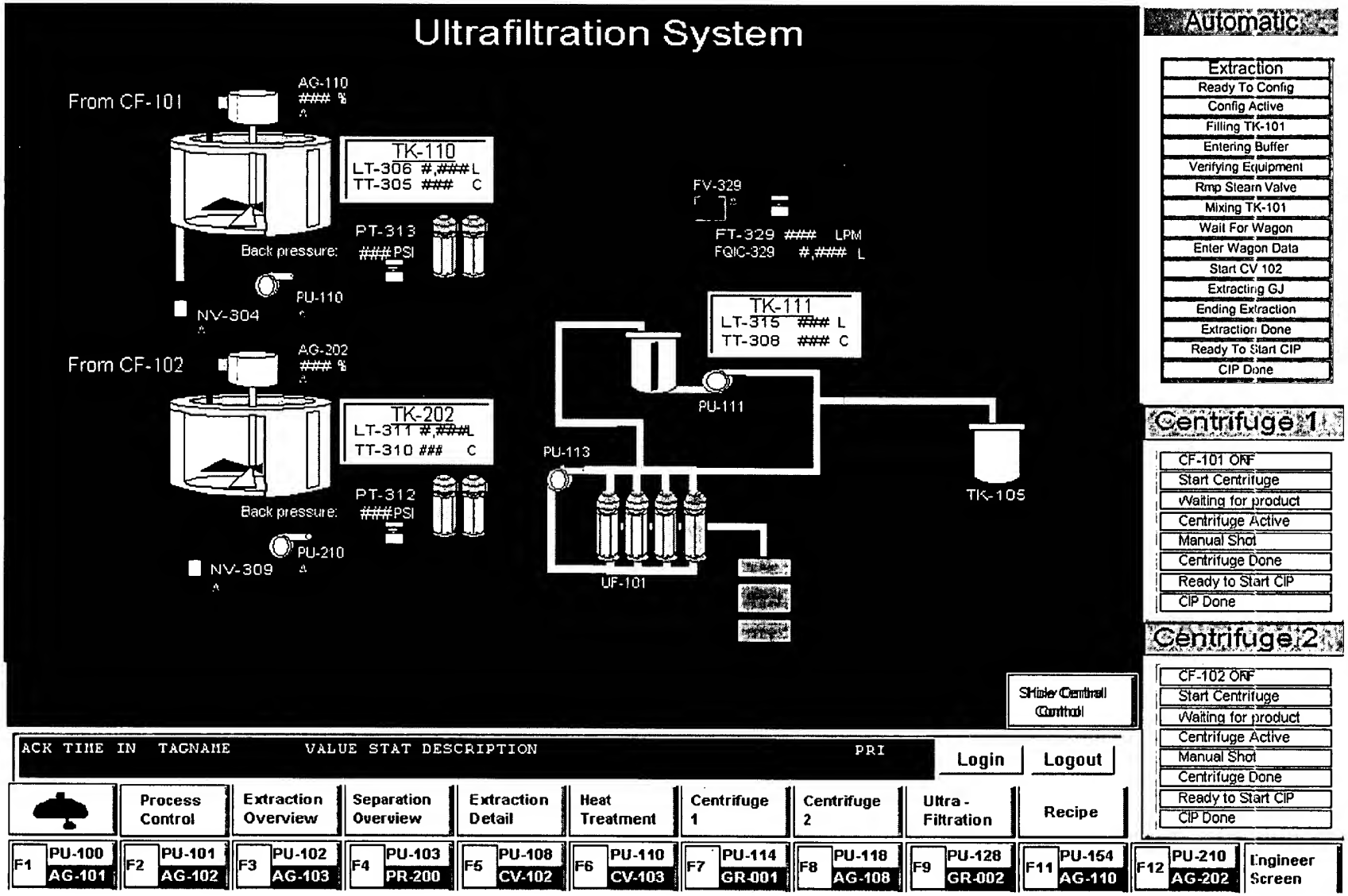


FIG. 30


Ultrafiltration System
From CF-101
AG-110
%
TK-110
LT-306 #,###L
TT-305 ### C
PT-313
###PSI
Back pressure:
PU-110
NV-304
From CF-102
AG-202
%
TK-202
LT-311 #,###L
TT-310 ### C
PT-312
###PSI
Back pressure:
PU-210
NV-309
FV-329
FT-329 ### LPM
FQIC-329 #,### L
TK-111
LT-315 ### L
TT-308 ### C
PU-111
PU-113
TK-105
UF-101
Automatic
Extraction
Ready To Config
Config Active
Filling TK-101
Entering Buffer
Verifying Equipment
Rmp Steam Valve
Mixing TK-101
Wait For Wagon
Enter Wagon Data
Start CV 102
Extracting GJ
Ending Extraction
Extraction Done
Ready To Start CIP
CIP Done
Centrifuge 1
CF-101 ONF
Start Centrifuge
Waiting for product
Centrifuge Active
Manual Shot
Centrifuge Done
Ready to Start CIP
CIP Done
Centrifuge 2
CF-102 ONF
Start Centrifuge
Waiting for product
Centrifuge Active
Manual Shot
Centrifuge Done
Ready to Start CIP
CIP Done
Shirley Central Control
ACK TIME IN TAGNAME VALUE STAT DESCRIPTION PRI
Login
Logout
Process Control
Extraction Overview
Separation Overview
Extraction Detail
Heat Treatment
Centrifuge 1
Centrifuge 2
Ultra - Filtration
Recipe
F1 PU-100 AG-101
F2 PU-101 AG-102
F3 PU-102 AG-103
F4 PU-103 PR-200
F5 PU-108 CV-102
F6 PU-110 CV-103
F7 PU-114 GR-001
F8 PU-118 AG-108
F9 PU-128 GR-002
F11 PU-154 AG-110
F12 PU-210 AG-202
Engineer Screen